University of Alberta

Teacher Development: Enhancing Effective Teaching in Elementary School Physical Education

by

Clive Nigel Hickson

A thesis submitted to the Faculty of Graduate Studies and Research in partial fulfillment of the
requirements for the degree of Doctor of Philosophy

Department of Elementary Education

Edmonton, Alberta
Spring 2005

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Dedication

Dad

This is for you

x

Abstract

Classroom research has been able to determine effective teaching practices that result in positive learning outcomes (Borich, 1996). However, research has demonstrated that teachers in a physical education environment often regard their lessons to be successful when children are *busy, happy, and good* (Placek, 1983) and that student learning is of a low priority (Hickson & Fishburne, 2002). This research study was conducted to gain an understanding of how effective physical education teaching practices can be developed in elementary school teachers. Three volunteer elementary teachers participated in a teacher development program. The teacher development program was introduced as an intervention strategy utilizing a single-case, multiple baseline research design. Student behaviours during physical education classes were recorded and analyzed through duration recording methods. In addition to the multiple baseline design, qualitative methods were used to determine the opinions of the teacher and student participants. Results indicated that the teacher development program changed student behaviours. After the introduction of the teacher development intervention program, student behavioural data indicated an increase in student engagement rates and a decrease in those behaviours contributing to non-engaged time. Opinion data from both teachers and students indicated that teaching was perceived to have become more productive, that learning became of a greater importance, and that time for activity had increased during lessons after the introduction of the teacher development intervention strategy.

Acknowledgements

I would like to acknowledge the support provided to me by various individuals throughout this journey.

First, I would like to extend my thanks and appreciation to Dr. Graham Fishburne. I am truly grateful for the advice, guidance, support, and trust that you provided me throughout my program and the completion of this study. Your mentorship has been invaluable. Thank you.

Dr. Bob Frender, your attention to detail and critical analysis of my work challenged me to achieve the highest standards. Thank you.

Dr. Larry Beachamp, Dr. Nancy Melnychuk, Dr. Brian Nielsen, and Dr. Dick Sobsey your interest, support, and willingness to be part of this process is much appreciated and your thoughtful questions have assisted in my growth as a researcher and an academic. Thank you.

Mr. Stephen Berg your unfailing support and encouragement was always welcomed and gratefully received. Thank you.

Last, but certainly not least, Jill, Selena, and Tim I could not have done this without your understanding. Your constant support and love kept me going even in the darkest hours. For that I will always be in your debt. Thank you.

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CHAPTER 1

INTRODUCTION

For children to reach their full potential in our schools, it would seem to be essential that teachers engage in effective teaching practices (Hickson & Fishburne, 2001). Through classroom investigation, researchers have been able to determine effective research-based teaching practices that are related to positive learning outcomes (Borich, 1996). This understanding has led to the use of the term *effective teaching* when discussing teachers and the techniques used to enhance student learning. The majority of the research on effective teaching has been conducted in the classroom environment, concentrating on more traditional subject areas such as mathematics and language arts. Consequently, only a relatively small amount of information has been gathered in the area of physical education, and knowledge of what is effective physical education teaching and how it supports student-learning outcomes is limited.

Being an effective teacher is a critical goal for all educators to aim for and to achieve (Hickson & Fishburne, 2001). However, because both novice and experienced teachers want to improve their practice in order to achieve a positive impact on student learning, it is possible to promote new teaching styles, behaviors, strategies, or ideas that are not built upon knowledge created from research findings (Bellon, Bellon, & Blank, 1992). Experienced teachers of physical education develop their own *craft knowledge*, that is, their own perceptions of what they believe is effective teaching based on their years of experience honing their teaching craft. Although it is possible for experienced teachers to reflect on new strategies and ideas and to compare these against their craft knowledge, teachers can, without the knowledge or the

understanding of underlying assumptions and principles, still accept new approaches that are not supported by research-based evidence. This can result in strategies being incorporated into teaching that have not been researched and found to be effective. Depending on the depth and accuracy of a teacher's craft knowledge, and the appropriateness of the new strategy being adopted, student learning can be negatively affected.

Therefore, it is important to determine what effective teaching of physical education is, if effective teaching behaviours can be introduced to and implemented by teachers, and if effective physical education teaching can support student-learning outcomes. These issues represent gaps in research knowledge that need to be attended to if teachers of physical education are to truly help students become *physically educated*.

Purpose of the Study

This research study examined the effectiveness of a teacher development program on student behaviour in a physical education setting. The teacher development program, which was specifically designed for this study, emphasized student learning. A single-case, multiple baseline design was employed to determine the effectiveness of the teacher development program.

Three teachers in three physical education class environments were the recipients of the teacher development program, which was the independent variable in this study. The program was based on the conclusions drawn from classroom research on effective teaching and on the opinions of physical education researchers about the characteristics of effective teaching. The dependent variables in this multiple baseline

study were measures of the duration of seven student behaviours: (a) amount of time the students spent waiting, (b) amount of time the students spent in transition activities, (c) amount of time the students spent in management activities, (d) amount of time the students spent in inappropriate activity, (e) amount of time the students spent receiving information, (f) amount of time the students engaged in activity, and (g) amount of time the students spent in off-task activity.

In addition to the multiple baseline design, qualitative methods were used to: (a) determine the teacher participants' opinions and understanding of the teaching of physical education before participating in the teacher development program, (b) investigate if and how the teacher development program changed their opinions and understanding of the teaching of physical education, (c) determine the students' opinions about their physical education lessons before their teachers had participated in the teacher development program, and (d) investigate if and how the students' opinions about their physical education lessons had changed after their teachers had participated in the teacher development program.

At present, teachers of physical education rely on information that has been gathered from other curricula areas to guide their teaching to support student achievement of learning outcomes. However, the uniqueness of the physical education environment means that such reliance may well be tenuous. For example, should the teaching behaviours that work in classroom settings be expected to be equally successful when applied in the gymnasium? It was hoped that the results gained from this study would provide insight for teachers of physical education. In particular, whether a teacher development program for elementary generalist trained teachers can

create a more effective physical education learning environment for the student learners.

CHAPTER 2

REVIEW OF RELATED LITERATURE

The purpose of this study was threefold: (a) to investigate the effectiveness of a teacher development program on student behaviour in physical education; (b) to understand the teachers' opinions of the teacher development program; and (c) to investigate the students' opinions of their physical education lessons prior to and after the implementation of the teacher development program. Owing to the different dimensions of this study, this review is divided into the following sections: research on teaching in physical education, effective teaching; implementing change models, methodological literature, synthesis of the literature, and research questions.

Research on Teaching in Physical Education

As the majority of the research on effective teaching has been concentrated in traditional academic subject areas such as mathematics and language arts, physical educators were left to develop their own parallel research studies that were specific to their context. Hence, compared to most school subjects, physical education was a late arrival on the teacher effectiveness scene (Mawer, 1995). The major research studies involving effectiveness in physical education have studied such areas as curriculum time allocation, the effects of increased amounts of physical education on academic performance, physical education instructional methodology, and student engagement.

Curriculum Time Allocation

With regard to the perceived value of physical education, Hardman (2000) contended that a survey of 167 nations, autonomous states, and provinces revealed that educational partner groups (parents, teachers, and head teachers) were generally

unsupportive of physical education and that most often were antipathetic towards its goals and aims. For example, head teachers perceived physical education as a non-academic subject with an orientation toward recreational activity rather than educational experiences. Teachers, other than physical educationalists, regarded physical education as a peripheral subject, nonacademic, lacking in educational value, and being a recreational activity. Parents viewed time spent in physical education as a threat to academic and examination performance.

The amount of time allocated to physical education in school timetables has most probably been influenced by such attitudes. For example, in Canada, despite recommendations from the Canadian Association for Health, Physical Education, Recreation, and Dance (CAHPERD) (1992) stating that children should receive physical education for at least 150 minutes per school week, there are still educational jurisdictions that have no recommended or stipulated time allotments for physical education (Hickson, 2003). In these cases, principals and teachers can decide on the time allocated to their weekly physical education program. This freedom of choice has resulted in some children receiving as little as one 45-minute class of physical education per school week (Richard & Picard, 1999). This trend can also be seen in other countries. For example, in the United Kingdom, the National Association of Head Teachers (1999) concluded that the emphasis on literacy and numeracy programs has caused other subject areas, such as physical education, to suffer. From a survey of schools in Northern England, Warburton (2000) stated that over half of the schools reported that their students received only one 30-minute physical education class per week. Warburton further suggested that physical education teachers in the United

Kingdom believed that the status of the subject has never been as bleak. Similarly, in the *Shape of the Nation Report* (NASPE, 2001), it is indicated that in the United States there is no federal law that requires schools to provide physical education programs and that Illinois is the only state that requires daily physical education for all students. The report indicates that at the elementary school level state mandated requirements vary across the country from 30 minutes per week to 150 minutes a week (NASPE recommends 150 minutes per week); that at the middle school level state time requirements range from 80 to 275 minutes per week (NASPE recommends 225 minutes per week); and that the majority of high school students take physical education for only one year between their 9^{th} and 12^{th} grades.

In an attempt to improve and update the content of the physical education curriculum in public schools, the Canadian provinces of British Columbia and Alberta have introduced new physical education curricula during recent years. British Columbia introduced its new curriculum in 1995, Alberta in 2000. Although implementation of the Alberta curriculum is still in its infancy, the British Columbia curriculum has been in place for a sufficient period of time to allow for an evaluation of its effectiveness to take place.

The British Columbia Physical Education Curriculum Review Report (2001) considered many of the issues regarding the implementation of the mandated provincial physical education curriculum. One issue was the amount of time allocated to physical education lessons within the overall school curriculum. Despite provincial standards indicating recommended time allotments, the report remarked that the majority of elementary schools do not allocate the recommended percentage of instructional time.

Similarly, using data collected prior to the implementation of the 2000 physical education curriculum, it was found that schools in Alberta also provided less time for physical education classes than recommended levels (Thompson et al., 2001). Given that research suggests that teachers do not use physical education lesson time effectively (Metzler, 1989; Siedentop et al., 1986), and the added fact that physical education lessons are not being taught for the minimum required time, the situation is even more disturbing.

This lack of priority given to physical education within the school system is not only reflected in the instructional time issue but also in school growth plans. The British Columbia Physical Education Curriculum Review Report indicated that only 1.7% of British Columbia schools mentioned physical education as a part of their annual growth plans. As schools base their professional development and in-service priorities on their growth plans, it can be assumed that physical education teaching is not regarded as an issue needing school-based attention.

Effects of Increased Amounts of Physical Education on Academic Performance

The connection between mind and body has been explored for many decades. Researchers have suggested that a *holistic* curriculum can support overall student development and connect mind and body (Fishburne, 1989; Fishburne & Haslam, 1986; Miller, 1988). Perhaps one of the most influential studies demonstrating the mind and body connection was conducted in Europe. France first began to experiment with a more holistic style school curriculum in the 1930s. In a summary of daily physical education research, Kirk (1989) reported that elementary school children in Lyon, France were first provided with an increase in physical activity and a decrease in

academic study in 1933. The positive results in physical well-being and in school attendance, coupled with no negative change in academic performance, prompted a second study to be conducted at L'Aide prior to the Second World War, which also yielded similar results to those found in Lyon. In response to the results gained from these studies, the French Ministry of Education conducted its own study in Vanves, a suburb of Paris. Experimental group children were provided with an increase of physical activity and a decrease in time spent on academics. Both control and experimental group students were tested on a number of measures including attitude, academic, and physical variables. The results on these measures showed that the experimental group students outperformed control group students. Hence, increased physical education was not detrimental to academic performance. Although, as Kirk pointed out, added nutrition provided to the members of the experimental group needs to be considered, these findings prompted similar program implementation in France and Belgium and have been the catalyst for many debates and decisions concerning daily physical education programs.

The findings from the Vanves research prompted a number of studies to be conducted in other countries. Research was conducted in Canada, Scotland, Germany, and Australia during the 1970s and 1980s and yielded results that support the notion that daily physical education does not have a detrimental affect on academic performance (Kirk, 1989).

Shephard (1997), in a review of longitudinal studies examining the influence of increasing physical activity time allotments upon academic performance, stated that research studies conducted in Australia produced evidence supporting increased

physical activity for school children. The School Health, Academic Performance, and Exercise (SHAPE) study (Dwyer, Coonan, Worsley, & Leitch, 1979 as cited in Shephard, 1997) involved 519 Grade 5 children in seven Adelaide schools. The classes in each of the schools were randomly assigned to one of three programs: fitness, skill development, or control. The programs had a duration period of 14 weeks. Both the fitness and skill development programs provided children with an increase of 210 minutes per week in physical activity time. The children in the fitness program gained in fitness and health, had more favourable teacher ratings of classroom behaviour, and were not significantly different in reading and arithmetic performance despite the decrease in academic time. Although, as Shephard indicated, the limitations of the relatively short observation period of 14 weeks needs to be considered and taken into account. A follow-up study conducted two years later indicated that the fitness and skill development program children had developed an advantage in reading and arithmetic scores and had received better teacher ratings of classroom behaviour.

In his review, Shephard (1997) cites further research from Australia. A cross-sectional study (Dwyer, Blizzard, & Dean, 1996 as cited in Shephard, 1997) involved 9,000 boys and girls from 109 schools. From the original sample, 2,400 students, aged 9, 12, and 15, were tested for physical fitness, leisure activity, and academic performance. With the 15-year old boys, involvement in lunchtime physical activity programs was found to be significantly associated with high academic scores. With the 9 and 12-year-old boys, high weekly levels of physical activity were significantly associated with high academic scores. When considering girls, there was a trend to an association between physical activity and academic performance, but it was not found

to be significant.

The Trois Rivieres study (Shephard, Volle, Lavellee, Barre, Jeqquier, & Rajie, 1977, cited in Shephard, 1997) involved 546 elementary aged school children in Quebec, Canada. Children in the experimental group received an extra one-hour per day of physical education, taught by a physical education specialist. The control group children received the Quebec standard physical education program of 40 minutes per week. Therefore, the children in the experimental group received 13-14% less academic instruction than those in the control group. Academic performance was computed annually on a number of measures, including French language skills, mathematics, English (upper grades only), science, and conduct. In the first year of the study the students in the control group, on average, out performed the students in the experimental group. However, during the next four years the experimental group students significantly outperformed those in the control group (Shephard, 1997).

The findings from these longitudinal studies prompted Shephard (1997) to remark that:

> One may conclude that longitudinal studies generally support the suggestion from cross-sectional data that academic performance is maintained or even enhanced by an increase in a student's level of habitual physical activity, despite a reduction in curricular or free time study of academic material. (p.119)

Physical Education Instructional Methodology

Rink (1993) suggested that teachers organize instructional experiences in a variety of ways. This variety is achieved in two ways. First, the level of responsibility

and engagement of the learner can be varied according to the lesson content and, second, both the teacher and the student can function differently in the instructional setting according to the organization of the experiences.

Arguably the most influential contribution to the understanding of instructional methodology has been Mosston's (1966) *Spectrum of Teaching Styles*, which identified the variety of styles associated with physical education teaching. The amount of decision-making given to the learner was the key determinant among the various styles (Rink, 1993). Mosston and Ashworth's (1986) revision of Mosston's original work viewed physical education teaching on a continuum from teacher-controlled environments to those that fostered student decision-making. The work of Mosston, and of Mosston and Ashworth, provided teachers with a better understanding of the teaching process and how to choose specialized approaches to promote different learning experiences (Rink, 1993).

This new interest in instructional methodology helped to promote the investigation of different teaching methods and their effectiveness. The number of studies conducted on teaching methods exceeded the number of research studies that considered effective teaching and student learning in the physical education setting.

In clarifying which teacher instructional methods promote student learning, Metzler (2000) found that, in terms of effectiveness on student learning, not all methods are equally supported by research. Metzler contended that varieties of instructional methodology could be categorized as follows: direct instruction; Personalized System of Instruction (PSI); cooperative learning; peer teaching; and, inquiry teaching. Metzler also suggested that Sport Education and Tactical Games

could be considered as instructional methodologies. However, it is questionable if these two approaches to the teaching of the games component of a physical education curriculum can be considered as true *instructional methodologies* as it would be more accurate to describe them as curriculum models.

Direct instruction. Direct instruction, which has been the subject of considerable research, is characterized by teacher-centred decision-making and student engagement patterns that are also directed by the teacher. When utilizing direct instruction, teachers employ a distinct set of learning objectives; students are provided with a model of the desired skill, movement, or concept; and learning is organized into segmented blocks. In this method of instruction, students are provided with little opportunity for decision-making; they follow teacher directions, and they respond to teacher-originated questions. This enables the teacher to achieve an efficient use of class time and high student engagement rates. Students receive closely supervised practice accompanied with a high amount of positive and corrective feedback (Metzler, 2000).

Although Metzler's work in 1979 concluded that direct instruction maximized academic learning time, his work of 1989 suggested that students were still likely to spend time listening to instructions and standing in line rather than practicing their motor skills. Rink (1996) stated "Most of the process-product research in physical education has identified direct instruction as an effective way to teach motor skills..." (p. 192). Rink further suggested, when considering group instruction of students in motor skill acquisition, that students would be successful in their learning if teachers developed and used a direct teaching methodology.

Personalized system of instruction. The PSI has a consistent base of support as an effective method of instruction. This method involves allowing students to progress at their own pace through a sequence of prescribed learning tasks. The majority of the research on the effectiveness of PSI has been with students of middle school age or older. Little is known on the effectiveness of PSI with students younger than the middle school age group.

Students involved in PSI tennis classes recorded higher rates in task engagement, skill practice time, academic learning, and success rate compared to students who were taught using a direct instruction approach (Metzler, 1984 as cited in Metzler, 2000). Later studies also found that students in PSI classes secured significantly higher learning gains over students in classes involving direct instruction (Metzler, 1986 as cited in Metzler, 2000); that teachers using PSI spent less than 1% of class time in management issues and almost 0% in task presentations; and that teachers using PSI provided three times as much feedback to students as did teachers who were not using the PSI method of instruction (Metzler, Eddleman, Treanor, & Creggor, 1989 as cited in Metzler, 2000). However, lower times spent in management issues and task presentation do not necessarily mean that the teaching is effective and that student-learning outcomes are being met.

Cooperative learning. Whereas most teaching methodologies were developed and honed by practitioners and researched later for their effectiveness, the cooperative learning method of teaching was designed and developed from research findings. This approach to the development of a teaching method can add strength to its validity. The research base contributed to the development of the method rather than the research

being used to determine if the instructional method actually worked.

Cooperative learning involves the placing of students into selected groups for learning. There is an expectation that all the members of the group will contribute to the learning process and outcomes to achieve a common goal that is normally set by the teacher.

Slavin (1995) suggested that the cooperative instructional method has been successful with students at every grade level and in all curricular areas. Grineski (1996), citing studies involving cooperative learning in physical education, found that there was general support for this method of instruction to promote fitness and positive social interaction. Yoder (1993) stated that in the area of dance, teachers following a cooperative learning method of instruction could improve social learning and achievement. However, the extent of the effectiveness of this teaching method has not been established throughout the physical education curriculum. Further study is still required to determine the effectiveness of cooperative learning in achieving the learning outcomes in all areas of the physical education curriculum (Hickson, 2002).

Peer teaching. Peer teaching instruction can be regarded as a variation of direct instruction. Whereas in direct instruction the teacher assumes a controlling influence in the learning situation, in peer teaching, a student, often named a tutor, is trained to observe and analyze the other student's performance. The intent of this type of instruction is to provide increased observation and feedback to performers.

Although variations of peer teaching instruction have been used throughout history (Wagner, 1990) it is difficult to establish the effectiveness of this approach through research. Peer teaching was found to be effective in increasing student

achievement by Foot, Morgan, and Shute (1990); however, the area of physical education was not studied. Little research has been completed in physical education to determine the extent of effectiveness of this teaching method. Mosston and Ashworth's (1994) reciprocal style teaching is the most notable version of peer teaching. This style involves the students working with peers, observing each other, and providing appropriate feedback based on teacher-set performance criteria. However, from a research perspective we know little about the effectiveness of this approach.

Inquiry teaching. Inquiry Teaching involves several teaching methods melded into one: indirect teaching, problem solving, exploration teaching, and, guided discovery. Teachers set the problem and students are engaged in the self-exploration of a wide range of possible answers, both cognitive and psychomotor. Typically, students are cognitively engaged prior to providing a movement style answer. In this style of instruction, students are provided with the opportunity to be decision makers and in charge of their learning, while teachers play a facilitating role.

Even though the inquiry method of teaching, in a variety of forms, has existed in physical education instruction for many years, there is little research validation for the achievement claims of its supporters (Metzler, 2000). In one of the few studies performed, Schempp (1982) found that students placed in shared decision-making groups had significantly higher scores on originality, elaboration, and creativity when compared to students instructed with teacher-centred decision making. Metzler further noted that the lack of research, however, has not stopped practitioners choosing this instructional approach, and many have attempted to validate its use through their personal *craft knowledge* of physical education.

Sport education. Although it could be suggested that sport education is not an instructional methodology, research findings have been used to suggest the effectiveness of its use. Sport education is an adaptation of the real life experiences of community sport organization. Students not only play but also experience such things as coaching, officiating, and organizing. Ultimately, students experience a program consisting of skills, decisions, customs, and traditions that surround the sport being learned.

Sport education relies on the combination of three different teaching methods: cooperative learning, direct instruction, and peer teaching. Thus, supporters of this approach often draw upon the general validation of the research concerning each of these three teaching methods. However, research has only looked at the three methods individually, and has not considered their effectiveness together. Therefore, research is still in its infancy regarding the effectiveness of this approach. What has emerged has been positive but has provided only limited research support thus far (Metzler, 2000).

Tactical games. Similar to sport education, the acceptance of tactical games as an instructional methodology is questionable. It is an approach to teaching the games component of the physical education program. The focus of attention is placed upon tactics, the combination of strategy and skill needed to perform in game situations (Metzler, 2000) Also, the student remains as a player within the game situation rather than being taken out of the game to practice isolated skills, tactics, or strategies (Kirk & Macphail, 2000).

The newness of this approach has meant that there is not a substantial research base for its validation. What little research that does exist, has provided a mixture of

results and prompted Metzler (2000) to conclude that although not necessarily a superior way to teach games it is a viable approach. Kirk and Macphail (2000) concluded that although there has been a considerable amount of interest in this approach to teaching games, "the results of the research to date do not provide unequivocal support for all of the claims of advocates..." (p. 11)

In summary, when considering the effectiveness of different instructional methodologies, the situation is not entirely clear. Research has not provided teachers of physical education with information that one instructional methodology is superior or more effective than another. Instead, research has indicated that different instructional methodologies are suited to differing situations within a physical education lesson, to the lesson content, or the style of learning being promoted. Therefore, a teacher could utilize a particular teaching methodology but still be ineffective in achieving the lesson outcomes.

Student Engagement

The relationship between time-on-task and student learning has received much attention in classroom based research studies to identify effective teaching. Student engagement is based on the notion that the more time a student spends on lesson content, the higher the student learning. The adaptation of the Academic Learning Time measure in the Physical Education arena (ALT-PE) (Siedentop, Tousignant, & Parker, 1982) was one attempt to understand how student engagement correlates with performance in physical education classes. The first results using the ALT-PE measure supported a positive relationship between student engagement and achievement, but this relationship was smaller than was expected (Silverman, Divillier, & Rammirez,

1991). Rink (1999) suggested that the failure to demonstrate a very strong relationship between ALT-PE and student learning might have been due to several factors. Firstly, the ALT-PE instruments use definitions that may be too generic to provide accurate interpretations of engagement in motor activity. Secondly, students could be highly engaged in a task but the task, although successful, may not be the one being measured. Lastly, the definition of motor engagement may not be as critical to learning as first thought. However, these suggestions have not been substantiated and remain as conjectures. Regardless, Rink concluded by suggesting that the knowledge of the time spent by a student engaged at an appropriate level of the lesson content is an important dimension of effective teaching.

As physical education is principally concerned with the psychomotor domain, it holds a unique position among school curricula. The notion that students learn more with increased practice should not be a surprise to educators, particularly when referring to students learning motor skills (Anderson, 1980; Rink, 1996). The more time spent practicing a physical skill, the more it will help the learner in skill acquisition. Hence, students need opportunities for plenty of practice. Researchers have studied the amount of time allocated for practice (Anderson, 1980). One of the most telling findings has been that, in a typical physical education class, students are actively engaged in practices for less than a third of the lesson time. Metzler (1989) found that students were involved in functional activity for 10-20% of a lesson. Siedentop, Mand, and Taggert (1986), in a review of six studies between 1978 and 1983 on academic learning time, found that students were involved in motor activity for only 21-30 % of a lesson. This brings into question whether the time allocated for practice in physical

education class is adequate. Accordingly, researchers changed their focus and began to investigate engagement, success, appropriateness of task, and allocation of sufficient amounts of time for practice. It was found that students needed to be engaged at a high level and to be successful at an appropriate task for a sufficient amount of time to gain motor learning (Cousineau & Luke, 1990; Goldberger & Gerney, 1990; Metzler, 1989; Silverman, 1985, 1990; Silverman et al., 1991). A high level of engagement was determined to be when a student was actively involved in the lesson, and participating successfully in activities that are deemed developmentally appropriate.

In an attempt to further extend knowledge about practice time, researchers changed their focus to consider the actual number of practice attempts. This research showed that the amount of student practice is not as important as the quality of practice (Ashy, Lee, & Landin, 1988; Buck, Harrison, & Bryce, 1991; Silverman et al., 1991). These findings fit well with the premise that a small amount of time spent practicing skills correctly is more beneficial to the learner than far greater amounts of time practicing skills incorrectly.

In summary, research has investigated how time is spent in physical education, the allocation of practice time, the number of practice opportunities, and the quality of the practice. The findings from such research have identified that students learn effectively when they are engaged in appropriate activity and provided with the time for quality practice.

Effective Teaching

In recent years, there has been considerable interest in the identification of teaching skills and competencies. The monitoring of standards and the quality of

teaching performance has become most apparent in public schools (Mawer, 1995). However, historically, the standards and qualities that were perceived to determine and indicate effectiveness have not always been consistent.

Regardless of consistency, the notion of being an effective teacher is an important and a critical goal for educators (Bellon et al., 1992). Rink (1996) stated that although the identification of effective teaching has always been a troublesome task, the identification of effective teaching is necessary if teachers are to become better at what they do and if a knowledge base is to be developed in order to train and educate preservice teachers.

Defining Effective Teaching

Effective teaching is a term that is difficult to define in a precise manner (Kirchner & Fishburne, 1998). Not only is the concept difficult to define but also the term itself, or the use of similar terms to mean the same thing, can prove to be confusing. Consequently, researchers have found it problematic to distinguish between terms such as expert, effective, and experienced (Berliner, 1986; Siedentop & Elder, 1989).

Difficulties also arise in determining the relevant criteria for defining effectiveness. For example, effective, experienced, exemplary, master, and expert are just a few of the terms used to describe the manner in which successful teachers teach. At times, these terms have been used interchangeably even within a study or piece of research. It could also be argued that because there is so much that occurs in a classroom that may rely on tacit, unconscious knowledge, it is difficult for a researcher to truly measure or accurately report on factors that influence teaching effectiveness.

However, the essence of the various terms that are used is that teachers are viewed as successful in their teaching when students are equally as successful in their learning. According to Harris (1999) effective teaching is a term that is used when teachers are successful in achieving an intended learning outcome from students. The notion that effective teaching results in intended learning has been supported by several researchers (Berliner, 1987; Brophy, 1979; Gage, 1978; Rosenshine, 1987).

Classroom Research on Effective Teaching

Although teaching has been a focus of attention for many years, even centuries, research on teaching is still a relatively new field of inquiry. Also, when research studies have been conducted, many different designs and methods have been used in attempts to pinpoint the differences between effective and ineffective teaching (Bellon et al., 1992). Initially, studies tended to be focused on teachers, not on the learning environment, trying to identify characteristics or qualities of effective teachers (Medley, 1987).

The initial idea of an effective teacher in the early 1900s was a judgement primarily based on the "goodness" of a person. Honesty, generosity, friendliness, dedication, and consideration were all regarded to be vital components of an effective teacher. These personal qualities needed to be demonstrated in an authoritarian, disciplined, and organized classroom (Borich, 1996). This definition of an effective teacher, Borich contended, clearly lacked any objective standards of performance. Bellon et al. (1992) suggested that the early educational research that was conducted in the 1900s focussed on understanding the learning process. This focus of research effort left the study of the science of teaching as a background issue. In a similar manner to

Borich, Medley (1987) concluded that when research was conducted on teaching, the emphasis was to determine the personal characteristics and qualities of teachers that supported effective teaching. Such research studies had little impact on teachers or the teaching profession because they merely compared such things as personal qualities of teachers (e.g., things such as the concern for children and subject matter knowledge) with their perceived ability to teach (Bellon et al., 1992).

This approach to researching the teaching process was limited by the amount and kind of information gathered, as student data were not collected. To understand if teaching was truly effective, researchers realized that they needed to not only consider teacher characteristics and qualities, but they also needed to look beyond the teacher to the students.

Research in the 1960s began to shift the focus from the personal characteristics of teachers to teacher and student behaviours (Bloom, 1981). These kinds of studies also saw researchers, for the first time, beginning to visit classrooms to gather information. During this time period, researchers began to specifically study teacher and student interactions. Instruments were developed to measure classroom interactions: frequency of interaction, types of questions, and response rates. These instruments were employed in research studies in the belief that effective teaching behaviours could be identified and, once identified, could be taught to teachers (Bellon et al, 1992).

Brophy (1979) noted that the 1970s brought about a significant improvement in research methodology. A variety of observation systems were used in descriptive style studies to identify both teacher and student behaviour. This methodological approach

was important in helping to determine what students and teachers were actually doing during lessons. However, it did not result in any further understanding of the characteristics associated with effective teaching (Mawer, 1995).

During the 1980s, research tried to identify the facets of classroom teaching that promoted an effective learning environment for children. Much of what we do know about effective teaching comes from this research base. These well-conducted classroom research studies attempted to identify what teachers do to produce student learning (Brophy & Good, 1986). Many of the studies were large, correlation style research designs investigating the relationship between the teaching process and the product, student learning. A limiting factor of correlation style research is that the researcher can only determine the strength of a relationship and cannot determine the causes of relationships. Although the researchers suggested causes, the accurate determination of effective teaching behaviours and skills was still a problematic task.

The majority of the research base in effective teaching has resulted from studies conducted in classroom environments. Based on such studies, Gipps (1992) stated that several elements have been consistently identified and are used by effective teachers: a structured day; a focus on one curricular area at a time; a provision of appropriate, plentiful, and wide-ranging tasks; a positive classroom atmosphere; a high level of expectation; and an appropriate discourse. In a review of research studies that showed an impact on student achievement and learning, Borich (1996) summarized effective teaching methods and outlined five *key* teaching behaviours that were supported by research: lesson clarity; instructional variety; teacher task orientation; engagement in the learning process; and student success rate. Several studies (Brophy, 1989; Brophy

& Good, 1986; Dunkin & Briddle, 1974) offered support for the five key behaviours suggested by Borich.

> Classroom researchers undoubtedly will discover other effective teaching behaviours, and attain a more thorough understanding of those already described. However, for the first time, research has provided a basis for better definitions of effective teaching and for training teachers. As classroom research continues, additions to and modifications of these five key behaviours undoubtedly will be discovered. But, today, these five stand as a practical starting point for defining the effective teacher. (Borich, 1996, p. 22)

From a review of research studies, Borich (1996) also found that five other behaviours seem to be related to effective teaching. He identified this second group of teaching behaviours as *helping behaviours*. However, the research identifying these behaviours is not as extensive as the research support for the original five key behaviours, and so findings are not as conclusive. Nevertheless, using student ideas and contributions, structuring, questioning, probing, and teacher affect have been identified as additional behaviours that act as a catalyst to enhance the performance of the five key behaviours. Their presence is thought to support and *help* the five key behaviours. Many of the ten terms of key and supporting behaviours put forth by Borich (1996) were not new to researchers. Some were previously identified but under different names. However, it was Borich who summarized the research findings on effective teaching and created these terms in order to bring clarification, consistency, and understanding to this research area.

Characteristics of Effective Teaching in Physical Education

In a review of physical education teaching research, Silverman (1991) suggested the following characteristics for the effective teaching of motor skills: the planning for class management and student learning; the anticipation of situations and contingency plans; the awareness of individual student skill differences and use of the information in planning and monitoring; the acquisition of information to plan; the knowledge of a repertoire of teaching styles and when to use them; the accuracy and focus of explanation and demonstration; the provision for adequate student practice time; the maximization of appropriate student practice and engagement; the minimization of inappropriate student practice and engagement; and the minimization of pupil waiting. However, Silverman's review has come under criticism by researchers (Mawer, 1995). For example, one of the criticisms from Dodds and Placek (1991) was that the "...list also focuses on what teachers do, ignoring both the specific student outcomes that accrue as a result and intended teacher goals relevant to a given teaching situation" (p. 367).

Rink (1993) also reviewed the research on effective teaching and identified seven distinct teacher characteristics associated with effective instruction in the physical education realm. She identified the following teacher characteristics: the identification of intended outcomes for learning; the planning of learning experiences to accomplish these outcomes; the presentation of tasks in a clear manner; the organization and management of the learning environment; the monitoring of the environment; the development of the lesson content based on student responses; and the evaluation of the effectiveness of instructional/curricular process.

Mawer (1995) in a review of research and viewpoints on effective teaching of physical education, suggested that the following characteristics are indicative of effective teaching: the planning of work effectively; the good presentation of new material; the organization and management of the learning experiences and students; the active involvement of the teacher in teaching students; the provision of a supportive and positive learning environment; the acquisition of a repertoire of teaching styles; and the ability to teach for the facilitation of student understanding of concepts and lesson content.

The characteristics suggested by Silverman (1991), Rink (1993) and Mawer (1995) bear some similarity to Borich's (1996) work. Several factors such as lesson clarity, structure, involving student ideas, and instructional variety have a commonality among the lists. However, there seems to be little, if any, research that has directly looked at the suggested characteristics of effective teachers from the research reviews of Silverman, Mawer, Rink or Borich to determine if the identified characteristics actually do affect student learning in the physical education domain.

Teachers' Perceptions of Effective Teaching in Physical Education

With regard to effective teaching in the realm of physical education, studies indicate that many teachers believe they are teaching effectively (Romar & Siedentop, 1995 as cited in Siedentop, 1998). This conclusion is based primarily on the teacher's own perception of important teaching criteria: explanation, feedback, demonstration, and student enjoyment. According to Siedentop (1998), for the most part, these perceptions could be considered accurate. Teachers do include explanation, feedback, and demonstration in their lessons, and students do enjoy classes. However, these self-

evaluation behaviours are based on perceptions of effective teaching and not on the understanding of a teacher's pedagogical content knowledge or student learning. It could be suggested, from the definitions of effective teaching provided by Berliner (1987), Brophy (1979), Gage (1978), Harris (1999) and Rosenshine (1987), that such perceptions are not accurate measures of teacher effectiveness because student learning is not considered.

It would seem that if student learning is a goal of teaching, then teachers should view student learning as being of prime importance. However, in the area of physical education, there is research evidence to suggest that this is not necessarily the case (Borys & Fishburne, 1986; Fishburne & Borys, 1987; Hickson & Fishburne, 2002; Placek, 1983; Schempp, 1983, 1985).

Placek (1982, as cited in Placek 1983) investigated teacher planning in physical education. She noted that student behaviour and environmental unpredictability had the greatest impact on a teacher's planning. Placek noted that successful physical education teaching was often defined by the teachers as keeping students participating (busy), with minimal misbehaviour (good), while providing enjoyment (happy). Placek concluded that the teachers were more concerned about student behaviour than the transmission of knowledge. In an attempt to further understand physical education teaching, Placek (1983) investigated student teachers' perceptions of successful and unsuccessful physical education teaching. Placek reported that student teachers, similar to experienced teachers, regarded their teaching as successful when their students were being *busy, happy,* and *good.*

Schempp (1983), in studying the transformation from student teacher to

teacher, found that student teachers rated physical education activities that were teacher approved as being very important. However, it was not the activity that was of key importance, but student engagement in the activity. In analyzing student teaching, Schempp (1985) noted that keeping students *busy* was of prime importance for student teachers when teaching physical education. Student teachers were satisfied when students were working (busy), enjoying themselves (happy), and were responding with questions and doing as they were told (good).

Borys and Fishburne (1986) replicated Placek's (1983) research in a Canadian university setting with high school preservice teachers. Their findings supported the conclusions drawn by Placek. Student teachers conceive of successful physical education teaching as not being related to student learning but rather to keeping students busy, happy, and good. In gathering further information on successful physical education teaching, Fishburne and Borys (1987) compared the conceptions of elementary school preservice teachers with those of experienced elementary school teachers. Once again, learning was not found to be the prime goal associated with successful teaching.

Hickson and Fishburne (2002) in a study comparing elementary school preservice teachers' and experienced elementary school teachers' perceptions of successful physical education teaching compared to other curriculum areas, found that in physical education teaching the trend of *busy, happy, and good* was evident for both student teachers and experienced teachers, with student learning receiving a low priority. However, when considering successful teaching in other curriculum areas, both student teachers and experienced teachers, rated student learning as the highest

indicator of successful teaching.

The research findings of these studies suggest that both student teachers and experienced teachers regard successful teaching of physical education differently from the definitions of effective teaching provided by Berliner (1987), Brophy (1979), Gage (1978), Harris (1999) and Rosenshine (1987).

Implementing Change Models

The continuous development of teachers is the cornerstone for the improvement of teaching (Fullan, 2001). The terms staff development and professional development are often used to describe teacher development activities. Although, these terms have been used interchangeably, the term professional development can be used to describe individually guided enrichment that leads to personal understanding and awareness, whereas staff development is the process of a large group or whole staff developing common goals or objectives for collective growth (Duke, 1990; Tindall & Coplin, 1989). Despite the confusion created by the interchangeable use of these terms, the definition of teacher development by Fullan (2001), who suggested that development activity is intended to improve the attitudes, performance, skills or understanding in a teacher's present or future educational role, would seem to be an appropriate description.

Whether referring to professional or staff development, such *teacher development* activities are not always effective. Several factors can hinder or promote the transfer of knowledge and training from teacher development activities to classroom environments. Wade (1985) suggested that the effectiveness of teacher development programs could be measured by any of the following four outcomes:

teacher reactions, teacher knowledge, teacher behaviour change, and increased student learning. According to Seyfarth (1996) teacher reaction to development activities is the least valid indicator of program effectiveness, whereas student learning is the ultimate test of success.

When considering the structure of a teacher development program, there are several issues to consider: length of training, time for self-analysis, group size, feedback, support, and collaborative activities.

The length of training in a teacher development program is an important issue to consider. Wade (1985) contended that the length of development activities did not warrant significant consideration. Sparks (1983), although in agreement with Wade, did suggest that more time is required for the delivery of material of a complex nature. Mohlman, Kierstad, and Gundlach (1982) stated that training sessions of a short period – three hours, spaced at intervals of two or three weeks over several months – were the most effective. Sparks (1983) suggested that teachers found it easier to cope with change when innovation is presented at a leisurely pace. Similarly, Seyfarth (1996) stated that the presentation of new material in small units at several sessions, rather than in one or two longer sessions, assists teachers in the integration of new practices into existing routines.

Length of program has not been the only time issue considered by researchers. The notion of personal time has also been identified as important. Stallings (1987) suggested that teachers needed adequate time for self-analysis and reflection if change was to occur in class environments. Time for teachers to reflect was also indicated to be essential by Carson (1997) and Jagger (1989).

Whereas it has been suggested that the size of the group receiving the teacher development sessions has little or no effect on the success of the program (Seyfarth, 1996), the amount of feedback and support provided to teachers does (Jagger, 1989). A change in teacher behaviour is much more likely to occur when the school principal is supportive of the change. The school principal can either serve to help or hinder teaching change (Fullan, 2001). Ward (1985) suggested that teacher development activities are more effective when teachers are provided with the opportunity to discuss new information, teaching behaviours, and strategies. Jagger, in support of the notion of collaboration, also stated that teachers needed to be able to collaborate when attempting to implement change.

Peer coaching, a term coined by Joyce and Showers (1988), is a technique that is used to assist teachers to learn new teaching behaviours. In peer coaching, teachers not only receive training in new techniques, but are also provided with information about the skills and strategies and the rationale behind the new technique. Practice of the new technique occurs under the observation of a *peer coach*. The peer coach critiques the teaching performance and discusses areas of improvement with the teacher (Seyfarth, 1996). Coached teachers have been found to use newly acquired techniques more appropriately than non-coached teachers (Joyce & Showers, 1988). Joyce and Showers further concluded that teachers who received peer coaching retained knowledge of new techniques longer and had a clearer understanding of the purpose and uses of the strategies.

Seyfarth (1996) contended that peer coaching could offer several advantages over the more traditional delivery of teacher development programs. Teachers who are

peer coached are more likely to receive immediate feedback on their performance and spend more time practicing new techniques. Therefore, the research on peer coaching suggests that it creates an environment that is conducive for changing teaching behaviours.

The design and delivery of a teacher development program is another important issue. Development programs can fail to impact teacher development due to the weakness of the design of the program training sessions (Showers, Joyce, & Bennett, 1987). Therefore, it is imperative that the training program be carefully designed and implemented if teachers are to be successful in the implementation of new techniques in their teaching. Showers et al. (1987) stated that the presentation of new material to teachers is most successful when the presentation includes theory, demonstration of the new strategy or technique, practice, and prompt feedback. Guskey (1986) however, suggested that presentation of new strategies or techniques is only the initial step in implementing change. Regular feedback, sustained support and follow-up are all critical elements of development programs. Hinson, Caldwell, and Landrum (1989) indicated that when planning for the transfer of training two important issues need attention. First, knowledge concerning the theoretical base on which the new technique or strategy is founded needs to be provided, and, second, what is learned in development sessions must be related to what regularly occurs in the teaching environment. The knowledge of realistic theory improves the probability of successful transfer to practice, whereas unrelated skills are neither retained nor transferred.

Continuity has also been indicated as a vital element of development programs. Continuity provides the reinforcement to continue use of new techniques or strategies

(Howey & Vaughn, 1983). The provision of follow-up activities provides feedback on the implementation process and addresses concerns related to implementation (Killion & Kaylor, 1991).

In summary, based on the research findings, it is evident that teacher development programs require certain characteristics to be successful. A program that consists of theoretical knowledge, demonstration, practice, and feedback in a peer coaching environment would seem to have the greatest chance for successful transfer to student learning situations.

Methodological Literature

For the purposes of providing information pertinent to this study, the review of related methodological literature covers systematic observation systems, single-case design, and interviews.

Systematic Observation Systems

Systematic observation systems can be used to analyze activity in educational environments. Darst, Mancini, and Zakrajsek (1983) stated that when using systematic observation and following stated guidelines and procedures, a trained observer can observe, record, and analyze interactions with an assurance that other observers viewing the same sequence of events would agree with the recorded data.

Systematic observation systems can be used for a number of different purposes: to describe classroom practices; to identify and modify teacher behaviour; to analyze teaching; to provide feedback about teaching; and to determine relationships between classroom behaviours and student growth. According to Darst et al. (1983):

If we are to explain moment-to-moment events during the teaching-learning

> process, we must employ some form of systematic observation instrument capable of providing quantifiable feedback. The use of observation systems should move the teaching process away from the unexplainable, hit-or-miss interaction toward a process that can be objectively planned, observed, assessed, and modified. (p. 6)

There have been many different types of observation systems used in pedagogical research. Darst et al. (1983) broadly categorized the variety of systems as interaction analysis systems, behaviour analysis systems, multi-use observation instruments, and coaching and teaching observation systems.

However, in the teaching environment of physical education, Hastie (1994) suggested that it was difficult to achieve a measurement that provided an indication of the extent of student achievement. From the findings of the Beginning Teacher Evaluation Study, Berliner (1979) contended that classroom research investigation had indicated that academic learning time might be a better measure of student learning than the more normally used student learning measures. Consequently, the concept of academic learning time was adopted for use in physical education research as an indicator of student learning (Hastie, 1994). Siedentop et al. (1982) stated that the ALT-PE measure was an effective way to analyze teacher practices and was a strong proxy for student learning.

The ALT-PE instrument was developed by Siedentop, Birdwell, and Metzler (1979) to investigate student engagement in physical education and was further revised and simplified by Siedentop et al. in 1982. The instrument was based on the original Academic Learning Time instrument for observing classroom processes in the 1978

Beginning Teachers Evaluation Study (Silverman & Zotos, 1987). The ALT-PE system is a measure of the amount of time a student is successfully engaged in activities that are related to the objectives of the lesson. This definition views student engagement as different from traditional definitions of time-on-task. In student engagement, student success and the appropriateness of the lesson content are also considered as essential measurement components. ALT-PE considers the amount of time a student is achieving a high level of success while engaged with the content of a lesson.

The ALT-PE instrument, classified by Darst et al. (1983) as a behavioural analysis system, has been widely used in the physical education environment (Lee, 1996). Lee further stated that the idea that the amount of time a student is engaged in activity, at an appropriate level, has been identified as being crucial to successful teaching and has been accepted as a measure to link teacher behaviour to student learning. However, initial research did not demonstrate a strong relationship between ALT-PE scores and student learning (Silverman et al., 1991; Yerg, 1983; Yerg & Tawdy, 1982), but more recent research studies have indicated that engaged time is related to achievement. The time spent in practice with feedback was found to be positively related to achievement (Silverman, Tyson, & Morford, 1988). Silverman (1991) contended that the evidence is overwhelming in linking the amount of time spent practicing at appropriate levels with student achievement. Metzler (1989), who summarized the research conducted on student time in physical education, found that at least 11 studies indicated moderate to strong correlations between student functional time and increased learning and that there was an absence of any study indicating a negative relationship.

Similar to ALT-PE, duration recording is another systematic observation system that has been used extensively in educational settings to provide researchers and teachers information concerning how time is spent in classrooms. According to Siedentop and Tannehill (2000) duration recording is one of the primary techniques of systematic observation and, as a method for observing and recording behaviour, has been used reliably by researchers. Rink (1993) suggested that duration recording answers questions of how time is used in the different dimensions of the teaching/learning process.

In duration recording, observers keep track of when an event occurs and for how long it occurs (Rink, 1993). Prior to the onset of data collection, clear definitions of the behaviours being recorded need to be established. Once collected, raw data are converted to a percentage figure that allows for comparisons to be made among a number of sessions (Siedentop & Tannehill, 2000). Rink (1993) concluded that duration recording can provide information about the time teachers spend observing, demonstrating, or organizing and also about the time that students spend in activity, waiting, and watching.

Single-Case Design

There are times when the more common styles of research design and data collection found in studies involving large sample sizes are not appropriate for investigators to use. These tend to be the case when the usual instruments are not pertinent and observation is the best method of data collection, when the sample size is small, and when intensive data collection on a few individuals is possibly more enlightening than more superficial data on many subjects. It is at these times that

single-case designs are utilized (Fraenkel & Wallen, 2000).

Although single-case designs have been used in many areas of research, such as psychology, education, social work and counselling, it has not been the primary methodology utilized by investigators in the area of social sciences (Kazdin, 1982). Primarily developed for use in special education environments, single-case design is most often used by researchers to investigate changes in behaviour after exposure to intervention strategies or treatments (Fraenkel & Wallen, 2000). Originally known as single-subject research, it is now referred to as single-case research in an attempt to discourage the term of *subjects* to describe human participants in research studies (Mertens, 1998).

Mertens (1998) contended that single-case research is appealing to researchers and practitioners in education because it can be used to test the effectiveness of specific instructional strategies on student behaviours and achievement. The term *single-case* can be misleading as it implies that one person is actually studied. In fact, large numbers of cases, entire communities and even cities have been studied as individual elements in single-case research (Kazdin, 1992). Kazdin further stated that single-case design could evaluate intervention strategies with groups and also address many of the questions that can be asked of between-group research.

In single-case design research the underlying rationale is similar to that of group design research; it studies the effect of an independent variable, an intervention or treatment strategy, on the dependent variable, normally performance or behaviour (Kazdin, 1992). Similar to other research methods, the procedures in single-case studies need to be standardized. Intervention or treatment strategies must be formalized

and monitored to ensure a consistency with the intended research plans (Kratochwill, 1992). Inferences drawn concerning the effect of the intervention rely on the repeated observation and measurement across all phases of the investigation (Kazdin, 1992; Kratochwill, 1992).

This type of continuous assessment is a basic requirement of single-case design research. It allows the researcher to examine the pattern and stability of performance or behaviour during the baseline stage, prior to the introduction of the intervention strategy. After the introduction of the intervention strategy, further continuous observation allows the researcher to examine whether any changes in behaviour or performance coincide with the introduction of the independent variable (Kazdin, 1992).

Primarily, single-case researchers utilize line graphs to present their data and to provide an illustration of the effect of the intervention strategy (Fraenkel & Wallen, 2000). Martens (1998) stated that the traditional manner of data analysis involves a visual display of the data accompanied by the researcher's skilled judgment to interpret what is exhibited. Kratochwill (1992) contended that when considering the trend and changes in the data, large and immediate impacts should be seen. Conversely, Levin (1992) indicated that large, immediate changes are not possible in all single-case research studies; some studies are designed to elicit small and delayed changes that are still genuine. Edginton (1992) and Busk and Marscuilo (1992) both recommended that statistical tests be used to supplement the visual interpretation of the data. This was in response to the argument concerning the subjectivity of visual data interpretation. However, Parsonson and Baer (1992) suggested that much of the concern expressed by researchers with visual analysis was flawed. Studies critical of visual analysis have

typically employed raters to evaluate graphs with little or no additional contextual information provided. Ottenbacher and Cusick (1991) determined that raters improved their visual analysis when provided with supplemental information and scored higher interrater agreement scores than those who received no supplemental information.

The decision to use statistical or visual analysis can affect the type of conclusions that are drawn from the research (Mertens, 1998). Researchers concerned with reaching predetermined rates of behaviour can determine their own levels of success, thereby not requiring statistical analysis. However, researchers wishing to assess the likelihood of outcomes would require statistical analysis. Levin (1992) provided greater clarity on this issue when he stated that visual analysis should be associated with tentative statements; confirmed predictions or replications should be accompanied by statistical analyses.

Multiple-baseline design. Single-case design involves four basic design options: phase change designs, alternating-treatment designs, factorial designs, and multiple-baseline designs. The differing designs vary in the nature of the question that is being addressed, the manner in which the effects of the intervention are demonstrated, and the requirements for experimental evaluation. Multiple-baseline designs require a repetition of treatment across behaviours, people, or settings (Kratochwill, 1992). This design is normally conducted when it is not ethical or possible to withdraw the intervention strategy from the treatment group (Fraenkel & Wallen, 2000).

In a multiple-baseline-across-subjects design, the researcher chooses a single behaviour, an independent variable, and the setting, and attempts to create a change in

two or more subjects (Mertens, 1998). The effects of the intervention strategy are determined by the introduction of the intervention to the different baselines at different points in time (Kazdin, 1982). Kratochwill (1978) suggested that an "intervention effect is demonstrated by showing that change in the data series accompanies introduction of the intervention" (p. 53-54).

The issue of the number of baselines required before researchers can establish confidence in the effects of an intervention strategy has been discussed at length. Although theoretically only two baselines are needed to derive useful information (Fraenkel & Wallen, 2000) typically, three or more are used (Barlow & Hersen, 1984; Kazdin, 1992). Kazdin further suggested that the number of baselines contributes to the strength of the intervention. Demonstration of the intervention effect is clearer with a larger number of baselines. Fraenkel and Wallen, in a discussion of the advantage of the number of baselines utilized in single-case design research, suggested that the larger the number, the greater the probability that the intervention is the cause of any observed changes in behaviour. The chances that an extraneous variable is the cause of any change in behaviour are lessened when researchers use two baselines, as it is unlikely that the same extraneous event occurred at two different times. Therefore, the chance that an extraneous event is the cause of changes in a multiple-baseline design utilizing three baselines is even less likely. However, researchers need to be aware that there can be problems with using a large number of baselines. The greater the number of baselines used, the longer the later baselines must remain in a baseline condition before the introduction of the intervention strategy (Fraenkel & Wallen, 2000). Monette, Sullivan, and Dejong (1986) concluded that although two baselines can be

used to gain information, three baselines are the ideal number.

Interviews

Interviews are a common form of research investigation used by educational researchers (Fraenkel & Wallen, 2000). It involves researchers asking a group of people questions concerning a particular issue or topic (Mertens, 1998). Such research, according to Fraenkel and Wallen, can be conducted in a variety of ways: by face-to-face administering of a questionnaire, by requesting responses to a questionnaire through the mail, through personal interviews, and by telephone. Questionnaires and interviews are very similar in their nature. The main difference is that a questionnaire is normally self-administered by the respondent, while an interview is verbally administered by the researcher (Mertens, 1998).

The nature of the questions asked in such qualitative inquiry research and the way that they are asked is of great importance (Fraenkel & Wallen, 2000). Questions need to be clear to ensure they are fully understood by the respondents. When using questionnaires or interviews to collect data, the audience for the questions needs to be carefully considered. Specialized or unusual words should be avoided, the same questions need to be directed to all respondents, and the conditions under which the questionnaire or interview is administered should be as similar as possible for all respondents (Mertens, 1998).

Mertens (1998) further suggested that it is important for researchers to pretest the questionnaire or interview schedule with a sample of people that are similar to the potential respondents. This is to ensure that ambiguities do not exist, that questions are not poorly worded or easily misunderstood, and that instructions are clear.

Personal interviews. Many of the features for conducting personal interviews are similar to those for administering questionnaires: clear, well-organized questions; critical questions placed throughout the interview period; and a logical sequence to the questions. However, an interviewer requires particular skills to ensure the overall success of the interview. Fraenkel and Wallen (2000) stated that an interviewer must establish rapport with the interviewee; engage the respondent; know how to ask questions in a manner that encourages in-depth responses; know when to move on to other questions or to follow-up in a non-directive way on unclear answers; and understand how gestures, manner, and facial expressions can influence the responses provided by the interviewee.

Mertens (1998) further suggested that interview duration, standardization of the process among all respondents, interview location, and method of data recording are all elements that interviewers must consider in order to conduct successful personal interviews.

Synthesis of the Literature

The review of related literature indicated several key issues. First, teacher behaviours and characteristics such as lesson clarity, instructional variety, teacher task orientation, engagement, and student success rate have all been identified through research to be effective in classroom environments. However, in the area of physical education, these behaviours and characteristics have not been researched to determine their effectiveness on student learning. Second, the implementation of a teaching model through a well-planned teacher development program can enhance and change teacher behaviour where needed. Third, systematic observation systems, such as ALT-PE and

duration recording, have been used to determine the particular events that occur in class settings. Fourth, single-case design is an appropriate method of data collection for studies involving small sample sizes. Fifth, the collection of interview data can provide valuable information from participants.

The implications associated with a lack of clarity and understanding of effective teaching should be clear to the physical education research community. At present, teachers of physical education are relying on effective teaching information either gained from studies that were not conducted in the physical education domain or merely opinions of researchers and practitioners. Effective teaching information from classroom studies may well be limited in the application to the gymnasium or the playing field. Opinions, although valuable, should at least be investigated to ensure their applicability. Therefore, study is required to provide a link between what knowledge presently exists from classroom research on effective teaching and physical education teaching. This research needs to extend the knowledge base of effective physical education teaching, beyond the opinions of researchers and practitioners, and investigate those teaching behaviours that impact the unique student-learning environment of physical education.

Understanding the relationship between effective teaching and the provision of an environment to support student learning in physical education is an area that needs to be addressed. Once this information is gained through research studies, information and direction can be provided to teacher practitioners. Teachers then have the responsibility to change or continue to use those characteristics and skills found to be effective in research studies. It is only then that students will begin to receive the

instruction that they need to become physically educated (Hickson & Fishburne, 2001).

Research Questions

The review of related literature identified several issues that, if attended to, could provide valuable insight for the physical education community. From the identification of these issues four research questions were formulated.

1. What, if any, are the effects of a teacher development program that emphasizes student learning, on student behaviour in elementary school physical education classes?
2. What, if any, changes occurred in the students' opinions concerning their physical education lessons?
3. What, if any, changes occurred in the teachers' understanding and teaching of physical education?
4. What opinions do the teachers involved in the study have concerning the teacher development program?

CHAPTER 3

RESEARCH METHODS

A review of research literature revealed a need to investigate and understand what constitutes effective teaching in physical education. Therefore, this research study was conducted to investigate the effectiveness of a teacher development program that emphasized student learning in elementary school physical education classes.

The research study employed two different research methods to answer the posed research questions. First, from the review of related literature, it was determined that a single-case design method would be an appropriate means to gather information about the effectiveness of the teacher development program and the teaching model that was designed specifically for the study. The single-case design method, utilizing the naturalistic setting of elementary school physical education classes, was used for the collection of the teaching environment data. The effective teaching model was incorporated into the teacher development program and the single-case design method was used to collect data on student behaviours. Second, qualitative data, using personal interviews of the teachers and students, were gathered concerning teachers' and students' opinions about the implementation of the teacher development program and about lesson effectiveness.

The Teacher Development Program

In this research study, the independent variable was the teacher development program. The teacher development program was introduced to the teachers in the form of a professional development program (see Appendix A).

Contents and Organization of the Teacher Development Program

From the review of related research, a teaching effectiveness model was developed to provide a focus for the teacher development program. The model incorporated the teacher characteristics that are associated with effective instruction in physical education. Both the characteristics of effective teaching and student learning were attended to in the teaching model utilized in this research study.

The model consists of three distinct phases: a thought and planning phase, a decision-making and action phase, and a postlesson reflection phase. The structure and content of the teaching model is diagrammed in Figure 1.

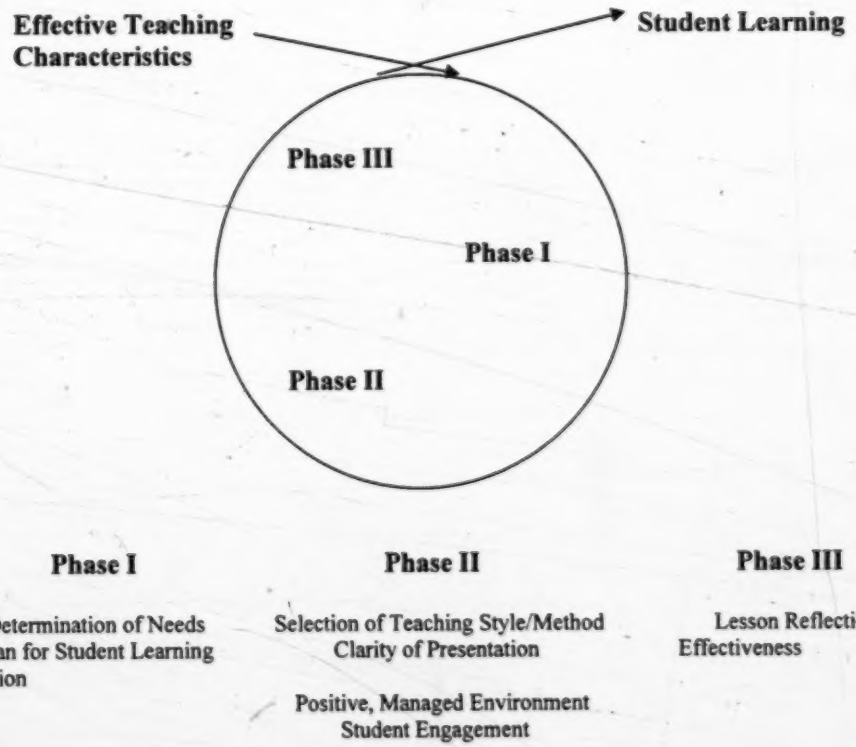

Figure 1. **The effective teaching model**

Phase I – Thought and planning phase. In Phase I, the thought and planning phase of the model, the teacher needs to consider two important features: the determination of student needs (Silverman, 1991) and the planning for student learning (Mawer, 1995; Rink, 1993; Silverman, 1991). The determination of student needs requires the teacher to decide upon the needs of the students in the class with regard to the choice of activity, the developmental appropriateness of the activity, and the curricular relevance. When planning for student learning, the teacher is required to determine exactly what the learning outcome is for the lesson and how it might best be achieved. This phase would occur prior to the lesson being taught.

Phase II – Decision-making and action phase. In Phase II, the decision-making and action phase of the model considers what needs to occur during the lesson. The teacher needs to consistently consider and assess what teaching style and method is most appropriate for the material being presented and the needs of the learning situation (Borich, 1996; Mawer, 1995; Silverman, 1991). While doing this, the teacher needs to aim for clarity of presentation in his or her teaching (Borich, 1996; Mawer, 1995; Rink, 1993; Silverman, 1991), a clarity that enables all students to clearly comprehend and understand what is being presented to them. The teacher also is required to provide an environment that is positive and well-managed in order to support and optimize the learning situation (Mawer, 1995; Rink, 1993). Lastly, in this phase, the teacher needs to ensure that there is a high level of student engagement (Borich, 1996; Silverman, 1991). Time for successful student practice of developmentally appropriate activity is maximized and the time required for transition or management sections of the class is minimized.

Phase III – Postlesson reflection phase. Phase III of the model consists of the post-lesson reflection (Carson, 1997; Jagger, 1989) and the evaluation of effectiveness (Borich, 1996; Rink, 1993). In this phase, the teacher needs to reflect upon the choices, decisions, and actions made during the first two phases of the model. The teacher also needs to evaluate the lesson content and what student learning occurred. From this reflection and evaluation of the effectiveness of what occurred prior to and during the lesson, decisions can be made for future lesson planning, content, and direction.

How and When the Program Was Delivered to the Teachers

The teacher development program was provided to the teachers individually, at the appropriate times after stable baselines had been achieved. Providing the program too early could have influenced teaching behaviours prior to the establishment of a stable baseline, consequently affecting the study. Therefore, teacher of Class A was the first to receive the teacher development program session, followed by the teacher of Class B and, finally, the teacher of Class C.

Each personal session of the program followed the same format and covered a similar plan to ensure that all three teachers were introduced to the independent variable in a consistent manner. The teacher development program included a series of sessions describing: (a) role of physical education for children; (b) developmental appropriateness; (c) putting theory into practice; (d) instructional strategy; (e) the proposed model, the theoretical framework, and its implementation; and (f) teacher reflection. A second component of the program was follow-up sessions, using a peer coaching style, to assist in the implementation of the program. Sessions occurred when the teacher had no teaching responsibilities. This meant that preparation time blocks,

after school, or lunchtime periods were chosen for sessions. Preparation time blocks provided the opportunity for a 60 minute session, whereas if a lunch period was chosen, the session lasted 45 minutes, or an after school session lasted 75 minutes. The total amount of 5.5 hours of session time for each teacher was consistent amongst each of the participants.

Pilot Study

A pilot study was conducted to *professionally develop* a teacher to check the peer coaching techniques necessary for successful teacher change, to provide assistance in understanding the length of time required for the teacher development, and to understand the relative appropriateness of the two systematic observation systems. In particular, the pilot study provided a practice opportunity for the peer coaching techniques necessary for successful teacher change, provided assistance in understanding the length of time required for the teacher development program, and provided direction in determining which systematic observation instrument was to be used. Because teacher development programs can fail to achieve the desired impact due to program design weaknesses (Showers et al., 1987), the pilot study served an important role in the study.

One female teacher volunteered to be the pilot study teacher. She regarded the teacher development program and the peer coaching techniques as being valuable and it was thought that it could be used to change behaviours. After receiving the teacher development program and being introduced to the effective teaching model, the teacher involved in the pilot study commented, "...the program makes sense, I can see how it

focuses on the student and learning…I can see how I would use the model in my lessons…yes, it relates to teaching, I like it."

The pilot study also helped to determine that the duration recording systematic observation system should be used in the study. The complexity and terminology of the ALT-PE (Siedentop et al., 1982) instrument resulted in a number of problems. The pilot study teacher, a generalist trained teacher, found the information provided by the ALT-PE instrument complicated and difficult to understand and consequently expressed that it was difficult to synthesize the information to make any changes to teaching behaviour. The teacher commented, "...I really don't understand what this means, so how can I use it to help me?…I know that I should understand, but I'm sorry it's a lot of numbers and language that I don't know. It reminds me of being in university! If you used this, I wouldn't want to be part of your study." However, the pilot study teacher perceived the

Duration Recording Instrument to be more useful than the ALT-PE instrument and more *teacher friendly*. The reasoning provided for this perception was that the instrument consisted of easy to understand language and terminology and that the information it communicated was in the form that the teacher would be able to use to reflect on their personal teaching behaviour. The pilot study teacher suggested, "…this one is much better, I use these kinds of words like this all the time, we use these terms in our staff meetings…when I look at this information I can see how I might be able to change my teaching…this is much better, it's friendlier for me…you don't need to be a p.e. teacher to use it!"

As the pilot study was conducted to determine which systematic observation system should be used in the study, the opinions expressed by the pilot study teacher were of significance. The pilot study teacher's comments were clearly in favour of the duration recording instrument. Therefore, it was decided that the duration recording systematic observation system rather than the ALT-PE instrument would be utilized for the study.

Participants in the Intervention Study

Three volunteer elementary school teachers from the same elementary school were selected for this research study. The selection of the three teachers was based upon their declared personal interest in participating in the proposed research study. The teachers were asked to be interested in learning how to become effective in their teaching of physical education. Each teacher taught physical education lessons to their class.

Teacher A was a female, grade 4/5 teacher with 25 students in her class. Teacher A had three years of teaching experience, all of which were at the elementary school level. Due to spending one of the three years covering several long-term leaves of absence, Teacher A had experienced teaching a number of different grades within the elementary school setting.

Teacher B taught a grade 2 class with 22 students. During her nine years of teaching she had taught the majority of the grades found in kindergarten to grade 12 school settings. Teacher C taught 24 students in her grade 1 class.

Teacher C had been teaching for a period of 19 years, all at the elementary school level. During her years of experience she had mainly taught the early

elementary school grade levels of grade 1, 2, and 3. During her career she had also been recognized as a teacher of excellence by the provincial education department, Alberta Learning.

Students were also considered as participants within the research study. Six students from each of the three classes were randomly chosen to provide information concerning their opinions of their physical education lessons. Of the six students randomly chosen from Class A, the grade 4/5class, two were boys and four were girls. In Class B, a grade 2 class, the six randomly chosen students consisted of three boys and three girls. In Class C, a grade 1 class, the six randomly chosen students consisted of three boys and three girls.

After observing the participation of his staff members in the study, the principal of the school requested to be a participant in the research study. It was the thought of the principal that he might be able to provide an insightful view of the teacher participants. Although, his role was not as in-depth as the role of the teacher participants, his involvement enabled information of a general nature to be gathered about the daily operation of the school.

Design of the Intervention Study

The multiple-baseline design achieved a time-lagged control through the systematic implementation of the teacher development program. The independent variable was applied to succeeding class environments, while the baseline period for each class environment increased in length. The teacher development program was provided to Class A while maintaining a baseline condition in Classes B and C. The teacher development program was also introduced to Class B while maintaining

baseline conditions in Class C. Finally, Class C received the same intervention as Classes A and B.

In each of the classes, the teacher development program was introduced after five lessons were videotaped and utilized for data collection. Seven classes for Class A were also videotaped and used for data collection after the introduction of the teacher development program, while 5 classes were utilized for both Class B and Class C. Class A had more occasions for postintervention data collection due to Teacher A receiving the intervention program first. Once the intervention had been introduced to Teacher A, it was important, from a research design point, to ensure that data were continually collected from Teacher A until all three teachers had received the intervention program and all data were collected on the other two teachers. This resulted in two extra classes being utilized for data collection of Teacher A.

The multiple-baseline design illustrates the effect of an intervention by demonstrating an accompanying change at the time of the introduction of the intervention strategy (Kazdin, 1992). The strength of the design is realized if, following the introduction of the teaching model intervention, a change is seen in Class A and not in Classes B and C. Consequently, greater strength is realized if corresponding changes occur in Classes B and C after the introduction of the teaching model intervention. This will enable any changes in behaviour to be attributed to the intervention strategy (See Figure 2). The multiple baseline design and its use of several baselines is ethically strong too, as the intervention strategy is not required to be withdrawn to demonstrate its effect (Barlow & Hersen, 1984). This is an important factor when considering educational research involving children.

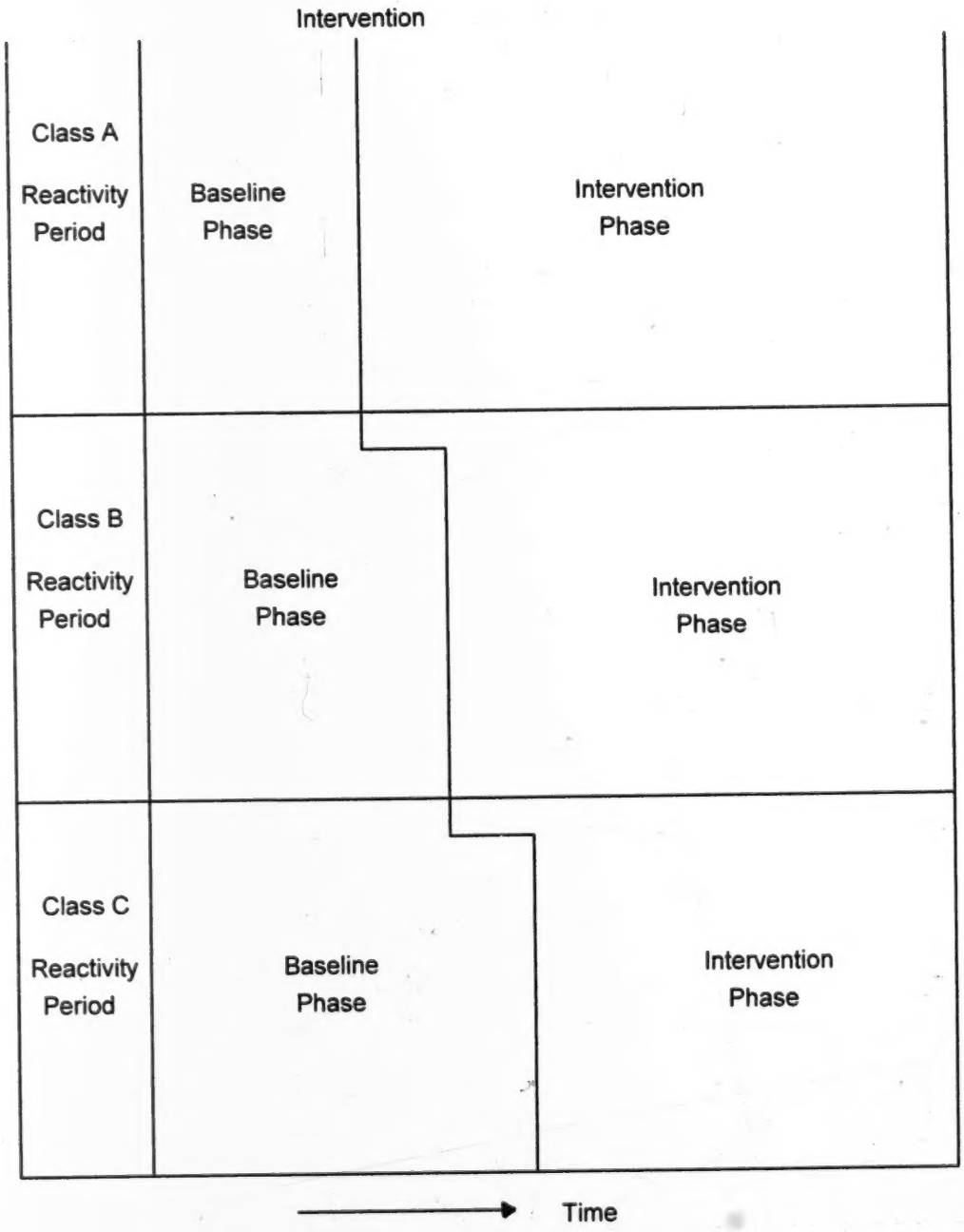

Figure 2. **Multiple-baseline-across-participants design of the study**

Duration Recording Instrument

Duration recording is a systematic observation instrument that describes how students spend their time (see Appendix C). Duration recording instruments have been used extensively in human behaviour research, their reliability has been well demonstrated, and they can be useful for the recording of any behaviour category (Siedentop & Tannehill, 2000). The amount of time that students are involved in behaviours such as receiving instructions, managerial activities, and engaged activity were identified by Siedentop and Tannehill (2000) as important for researchers to investigate when studying class environments.

In duration recording, the observer records student behaviour throughout the lesson. Behaviours are recorded according to categories established prior to the onset of data collection. During observation, the observer assesses what 51% of the students in the class are doing. Every 15 seconds the observer decides on the context of the behaviour, makes note of the corresponding time block, and records the behaviour on a recording sheet. Resulting data can be analyzed in terms of the percentage of lesson time spent by the students in each of the established categories.

Duration recording can provide a measure of students' opportunities to practice or learn in a class setting. Rink (1993) concluded that high levels of activity are desirable and that teachers should aim for an activity time level of at least 50% of the total time of a physical education class. As the instrument also allows for the recording of categories other than activity time, teachers can see where time is being spent that can be changed in order to increase activity time.

Dependent Variables in the Intervention Study

As duration recording can be used with a variety of behaviour categories, it is important that the behaviours to be recorded are defined clearly (Siedentop & Tannehill, 2000). Seven dependent variables were monitored in the study: wait time, transition time, management time, time spent in inappropriate activity, time spent receiving information, time spent engaged in activity, and time spent in off-task activity.

Wait time. Wait time refers to the amount of time in each lesson that students are not involved in activity or receiving any directions or instruction.

Transition time. Transition time refers to the amount of time in each lesson that students are involved in physically moving locations or changing focus from one activity to another.

Management time. Management time refers to the amount of time in each lesson that students are receiving direction or information concerning behaviour expectations or being provided with general class procedural instructions.

Time spent in inappropriate activity. Time spent in inappropriate activity refers to the amount of time in each lesson that students are involved in activities that are not developmentally appropriate.

Time spent receiving information. Time spent receiving information refers to the amount of time in each lesson that students are receiving instructions or direction concerning the task they are being asked to complete.

Time spent engaged in activity. Time spent engaged in activity refers to the amount of time in each lesson that students are actively involved in tasks that are developmentally appropriate and experience success.

Time spent in off-task activity. Time spent in off-task activity refers to the amount of time in each lesson that students are not attending to the given activity.

The seven behaviours were chosen to be dependent variables as researchers have identified them to be important indicators of an effectively taught lesson. When students are involved in lessons where there is limited waiting, transition time, and management activity there is a greater amount of the lesson available for learning to occur (Siedentop & Tannehill, 2000). This is also the case when students are actively engaged in developmentally appropriate activity rather than being involved in off-task behaviour or participating in activity that is developmentally inappropriate (Borich, 1996; Silverman, 1991). Also, although receiving information can be important, the amount of time spent in this activity can also lessen the time for available for learning, as students "in physical education are overinstructed and underpracticed" (Siedentop &Tannehill, 2000, p. 28).

Training of the Observers

Two independent observers were trained in the use of the duration recording systematic observation instrument chosen for the research study and the coding procedures associated with it. One observer served as the primary observer responsible for the data coding, while the second served as a secondary observer for the purpose of conducting reliability checks. Bailey and Burch (2002) stated that observers should be trained at the same time. This approach allows for the discussion of the observation

system and coding procedures and promotes an equality of understanding between the observers. During the training period a videotape of children involved in physical activity was used to simulate the physical education lesson environment that was be encountered during the research study.

Reliability of the Measurements

In situations where more than two observers are utilized to gather observation data, interobserver reliability needs to be established. The purpose of an interobserver reliability check is to gain a measurement of the extent of agreement of two persons independently observing and recording the same behaviour. By demonstrating that the use of the observation system and coding procedures are dependable, confidence can be placed in any reported differences in the data, and that such differences are not due to such things as observer bias and observer drift (Bailey & Burch, 2002). This reliability measure is established by a comparison of scores recorded by the observers for the same activity. The formula for the calculation of interobserver reliability is as follows:

$$\% \text{ of Agreements} = \frac{\text{Number of Agreements}}{\text{Number of Agreements} + \text{Number of Disagreements}} \times 100$$

Agreements occur when observers record the same activity or lack of activity during a specific time interval. Disagreements occur when observers define an activity

differently. To ensure that observations recorded is the product of the participants and a true record of what occurred, the percentage level generally accepted for interobserver reliability is 90% (Bailey & Burch, 2002; Zirpoli & Melloy, 1993).

Interview Instruments

A personal interview allows the researcher to conduct a face-to-face interview with the respondent. This method is an effective way to enlist the cooperation of those involved in the study, as rapport can be established, questions clarified, and answers can be checked for accuracy (Fraenkel & Wallen, 2000). In this research study, open format questions were utilized in the personal interview settings (See Appendix B). This allowed for more individualized responses (Fraenkel & Wallen, 2000). For transcription accuracy, interviews with the teachers were recorded with an audio device and the transcripts were verified for accuracy by the participants. Although student interviews were also audio- taped, the transcript verification accuracy employed with the adult participants was not replicated. The number of students involved in the interview sessions, their age, and reading level necessitated a different verification technique to be used. Therefore, responses provided by the students were repeated back to the children at the time of answering to ensure as accurate representation as possible.

Student Interviews

A group of six randomly chosen students from each class was interviewed in order to understand the students' thoughts and opinions of their physical education lessons. The interviews took place prior to the introduction of the teacher development program and at the conclusion of the study to determine if any changes in opinion had occurred.

Prior to collecting interview data from the students it was important to spend time with the students ensuring that they were reflecting on their physical education lessons and not on other activities such as recess or lunch time. This *grounding* of the students' thoughts provides for a level of confidence in their responses. The questions in the student interview tried to gain information concerning the content of their physical education lessons, the kinds of activities that they normally participated in, and their level of enjoyment. Appendix B indicates the questions asked of the students at each stage of the study.

Teacher Interviews

Each of the three teachers involved in the study were interviewed individually at the onset and also at the conclusion the study. The information gained provided an understanding of the opinions of the teachers concerning their teaching of physical education lessons and the teacher development program.

The preintervention interview questions (see Appendix B) asked the teachers to describe their previous experiences of teaching physical education, how they viewed their regular physical education lessons, and how effective they regarded their physical education teaching to be. The focus of the postintervention questions was slightly different. Questions were asked that dealt with the notion of change. It was asked if the teachers noticed any changes in their teaching. Also, opinions of the teacher development program and the teaching model it incorporated were solicited from the participants.

Procedures

A video camera was used for the collection of behavioural data during the physical education lessons. A minimum of three lessons were taped prior to the onset of the data collection stage of the research study to reduce student reactivity to the presence of the research observer and the video camera. The video camera was set up in the gymnasium to allow for the viewing of all of the students in the class during the lesson. This provided the trained observer, when viewing the videotape, the opportunity to view the activity of all the students participating in the lesson. When 51% of the students in the class were involved in the same activity, the trained observer would then determine the behaviour classification to be recorded. This procedure of recording of student behaviour continued throughout the length of the lesson. Each lesson was video taped in the same manner throughout the study. Excluding the lessons that were taped to lessen student reactivity, a total of 32 lessons were video taped throughout the study. Class A had 12 lessons video taped, Class B 10 lessons, and Class C 10 lessons. After the lessons, the videotapes were provided to the trained primary observer for analysis.

In addition to the observation data, personal interviews were also conducted with teachers and students to record pre- and postintervention opinions on the teaching of physical education classes. The procedure followed in implementing the interviews attempted to ensure that consistency was achieved across all participants. The group interviews conducted with the six randomly chosen students from each class were conducted in the school library at a time when there were no other occupants. This setting was replicated for all three of the student groups and was consistent for both the

interview held at the onset of the study and also at the conclusion. It is important to note that at no time during the study were the students informed that their teachers were involved in an intervention style program to improve their physical education teaching. Although parent and student consent forms indicated that the research study aimed to improve the teaching of physical education, how this improvement was to be done and when was not indicated. This information was withheld in order to ensure that students' responses were not influenced in any manner during the study.

With regard to the teachers, their personal interviews took place in their classrooms. This location was chosen because the teacher's classroom provided an area where disturbance was kept to a minimum and where teachers were at ease. An audiotape device was utilized with both the students and the teachers to ensure that accurate transcription of responses was gained after the session was concluded. Once the data had been verified for accuracy, common threads or themes were established to allow for qualitative interpretation of the responses.

Ethical Considerations

The research study was conducted as approved by the University of Alberta's Research Ethics Board. Prior to contacting teachers or students concerning their possible participation, consent was sought from the school district for permission to approach the school administration about the research study. A meeting with school district officials was arranged and written consent was gained to proceed with the research and contact the school. After discussing the research with the school principal, he agreed to be a participant in the research and also allow staff members and children at his school to be approached concerning their possible participation in the research

study. He also agreed to arrange a meeting in order to meet with any interested staff members. Consequently, a meeting was held with all those that were interested in participating in the study to explain the responsibilities of involvement and to provide an opportunity for questions to be answered. After the meeting, those teachers that expressed a continued interest in participating in the study were provided with participant consent forms to sign indicating their willingness to be part of the research. Once a teacher had returned a signed consent form, two information letters were sent to the home of each of the students in the teacher's class. One letter was for the parent/guardian and the other for the child. Each letter provided a description of the research, the difference being that the parent letter was written with an adult reader in mind and was more detailed, whereas the letter intended for the children was simpler. Each letter also informed participants that their participation in the proposed research study was free and voluntary and that they could have withdrawn at any time from the study without penalty or prejudice. Signed consent forms were collected from all the participants prior to the start of the study. In this manner, informed consent was obtained from all participants involved in the research study and enabled all participants to understand the obligations and responsibilities that accompanied involvement (see Appendix D).

Data collected during the research study were treated in a confidential and a secure manner. Names of participants were not placed on any data gathering information documents. Participants were assigned a letter or number and all documents and videotapes were kept in a locked cabinet when not being analyzed. At

all times, care was taken to ensure that all participants were treated in a manner that was respectful of their rights and personal dignity.

CHAPTER 4

RESULTS

The purpose of this study was to gain a better understanding of effective teaching in elementary school physical education, creating a link between what is presently known of effective classroom teaching and its possible application to the teaching of physical education. An intervention strategy, a teacher development program that emphasized student learning was specifically designed for this study.

The teacher development program was the independent variable for the study. The teacher development program was designed to impact teacher behaviour and, consequently, student behaviour in physical education classes. In particular, the teacher development program included an effective teaching model that emphasized student learning.

The study design involved the observation of three teachers and their physical education classes. Each class was observed for three lessons prior to the commencement of data collection. These lessons allowed for the children in each class to become comfortable with the presence of the researcher and a video camera in the gymnasium. After allowing for an acclimatization period, further lessons were video taped and used for data analysis. Class A was observed for a total of 12 lessons, Class B was observed for 10 lessons, and Class C was also observed for 10 lessons.

Seven dependent variables were monitored throughout the study: wait time, transition time, management time, time spent in inappropriate activity, time spent receiving information, time spent engaged in activity, and time spent in off-task

activity. The Duration Recording observation method was used to determine any changes in these student behaviours throughout the study.

Students' opinions concerning their physical education lessons were gained through interviews in a group setting. Similar to the student opinion data collection, teacher opinions concerning the effectiveness of their physical education lessons and the teacher development program were also gained through interviews. However, unlike the students who were interviewed in a group setting, teacher participants were interviewed individually.

The reporting of the results of the study will be as follows: interobserver agreement; effects of the teacher development program on students' behaviour; students' opinions about their physical education lessons; changes in teachers' understanding and teaching of physical education; and, teachers' opinions about the teacher development program.

Interobserver Agreement

The principal investigator videotaped all of the physical education lessons during the student reaction period and the data gathering lessons. Two independent observers were trained to use the duration recording instrument and the coding procedure in order to code the taped lessons. To lessen observer drift, where an observer may begin to record behaviours differently from the established definitions in the training program, both independent observers were required to undergo a period of retraining during the data analysis work where instrument use and coding procedures were re-emphasized. The primary observer's role was to analyze all the videotaped lessons; the second independent observer was trained for reliability purposes. An

interobserver agreement score of above 90% was attained prior to the commencement of the data analysis (see Appendix E). Three other reliability checks were also conducted throughout the data recording. Each check resulted an interobserver reliability score of above the acceptable 90% suggested criterion (e.g. Bailey & Burch, 2002; Zirpoli & Melloy, 1993). This would suggest that throughout the data analysis stage, the observer analyzed the events occurring in the gymnasium and recorded the specific behaviours in a reliable manner.

Effects of the Teacher Development Program on Students' Behaviours

The behavioural variables recorded for this study were: wait time; transition time; management time; activity inappropriate time; receiving information time; activity engaged time; and activity off-task. The observation recordings for all three classes, Class A, B, and C are displayed in Appendix F. Table numerals in this appendix represent the percentage of lesson time spent in each of the behavioural variables.

The multiple-baseline design is constructed to achieve a time-lagged control through the systematic implementation of the intervention strategy, the teaching development program. Therefore, in this study, the teacher development program intervention was provided to Class A while maintaining baseline conditions in Classes B and C. The teacher development program intervention was then introduced to Class B while maintaining baseline conditions in Class C. Finally, Class C received the same intervention as Classes A and B. A total of 32 lessons were observed for the three classes, these lessons occurred over a period on 37 school days. The graphs in figures 3 through to 9 indicate the lesson order according to where the lesson occurred in

relation to the 37-school day time frame of data collection. Providing the data in this graphical format assists in understanding the effectiveness of the intervention program.

Kazdin (1992) concluded that the strength of the multiple baseline design is realized when, following the introduction of the intervention, a change is seen in Class A and not in Classes B and C and, consequently, greater strength is realized if corresponding changes occur in Classes B and C after the introduction of the intervention.

Effects on Wait Time

The effects on wait time are illustrated in Figure 3. Analysis of the baseline data for Class A indicated that the mean percentage amount of time per lesson that students spent waiting was 3.16% (SD = 2.06). Means and standard deviations for all three classes are displayed in Appendix G. The teacher development program intervention was introduced to the teacher of Class A after five lessons. Following the intervention, the mean percentage amount of time per lesson that students spent waiting decreased to 1.3% (SD = 1.58) per lesson. Figure 3 illustrates that there was a degree of variability in the amount of time spent waiting in each individual lesson. This variability in the trend of the data path is not necessarily evident in the reported means for each phase of the study. There is an overlapping nature in the scores between the baseline and postintervention phases of the study. It is important to note that wait time was decreased to the minimum amount of 0% for four separate lessons during the postintervention phase. However, the 0% wait time was not a stable trend in the data. It was interspersed with scores that were as high as some of those during the baseline phase.

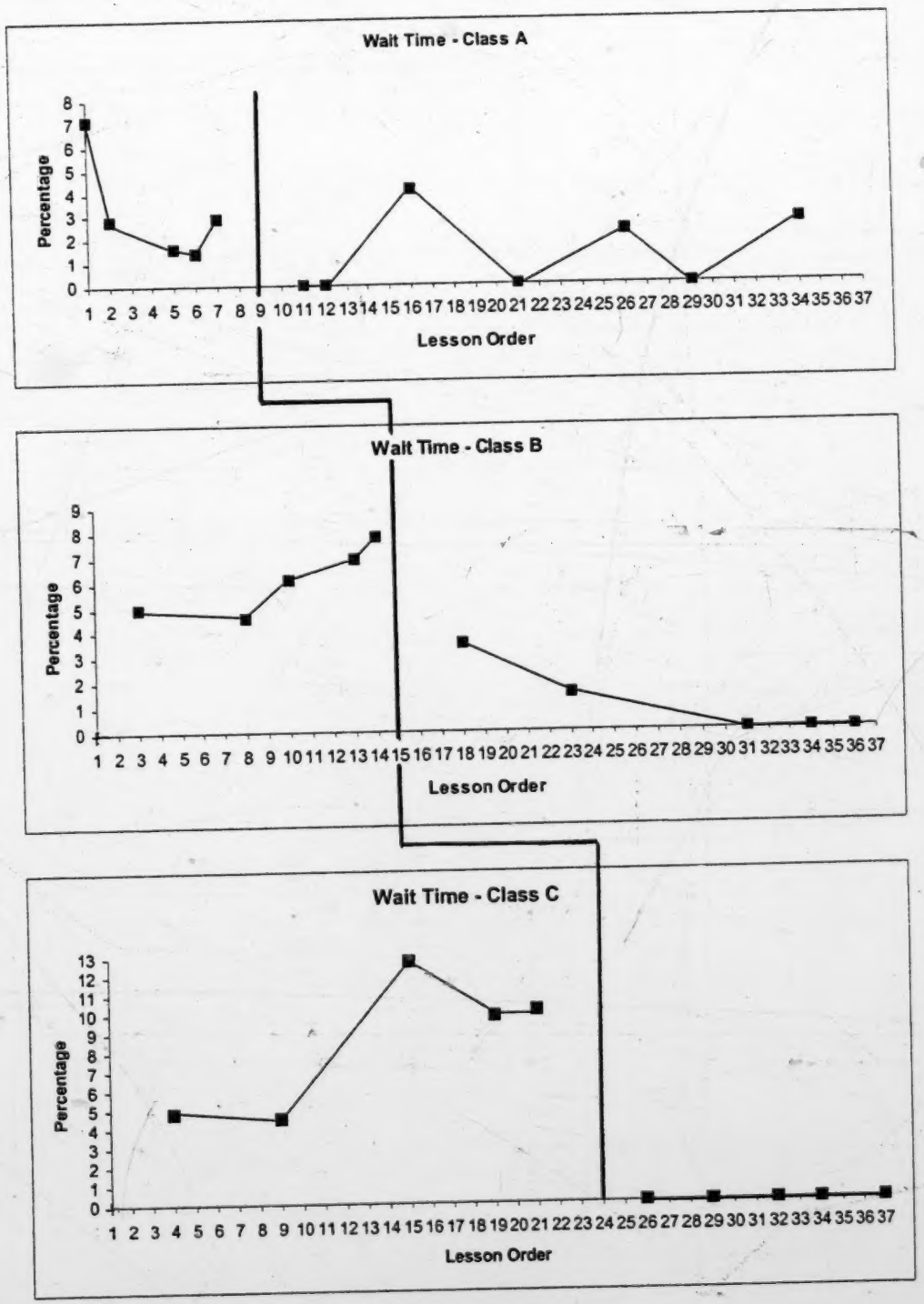

Figure 3. **Effects on wait time across multiple baselines**

The Class B teaching environment had a baseline phase that consisted of five lessons prior to the introduction of the teacher development program intervention, and five lessons during the maintenance or postintervention phase of the study.

Analysis of the baseline data indicated that the mean percentage amount of lesson time that students spent waiting was 6.08% (SD = 1.18). The teacher development program intervention was introduced to the teacher of Class B after five lessons. Following the intervention, the mean percentage amount of lesson time that the students spent waiting decreased to 1.00% (SD = 1.38). Figure 3 illustrates that the introduction of the intervention strategy is accompanied by a change in the level and trend of the data path. With regard to the level, the post intervention phase data points are all lower than those found during the baseline phase. Of particular note, was that the last three data points were at the lowest possible level, zero. Also, the data points during the postintervention phase experienced a marked downward change in trend that clearly accompanies the introduction of the intervention strategy.

Analysis of the baseline data for Class C indicated that the mean percentage amount of time per lesson that the students spent waiting was 8.38% (SD = 3.21). The teacher development program intervention strategy was introduced to the teacher of Class C after five lessons. Following the intervention, the mean percentage amount of time per lesson that students were waiting decreased to 0% per lesson.

Figure 3 illustrates that there was some variability in the amount of time spent waiting in each individual lesson during the baseline phase of the study. However, it is still visually evident that there is a change in the level and trend of the data after the introduction of the teacher development program intervention. At the start of the

postintervention phase, wait time decreased to the minimum possible amount of 0% and maintained this trend and level throughout the rest of the lessons.

The effects of the teacher development program on wait time were most profound in Class C. Class B also experienced a decline in wait time but the trend was not as instant as that of Class C. Although Class A did have several lessons where wait time was at the lowest possible level, these lessons were interspersed with other lessons where wait time was still present.

Effects on Transition Time

Figure 4 illustrates the effects on transition time for the three classes. The baseline data for Class A indicated that the mean percentage amount of time spent in transition activities per lesson was 14.36% (SD = 2.88). Following the introduction of the intervention strategy, the mean amount of time spent in transition activities in a lesson decreased to 9.40% (SD = 4.17).

It is visually evident that the introduction of the intervention strategy to Class A's teacher was accompanied by a change in the level of the data path. There was a degree of variability in the trend of the data scores though (see Figure 4), scores overlapped in both the baseline and postintervention phases of the study. However, there is a general downward trend in the postintervention phase of the study that is not evident in the baseline phase, indicating that transition time was being decreased in the teaching environment.

With regards to transition time for Class B, the baseline data indicated that the mean percentage amount of lesson time spent in transition activities was 12.02%

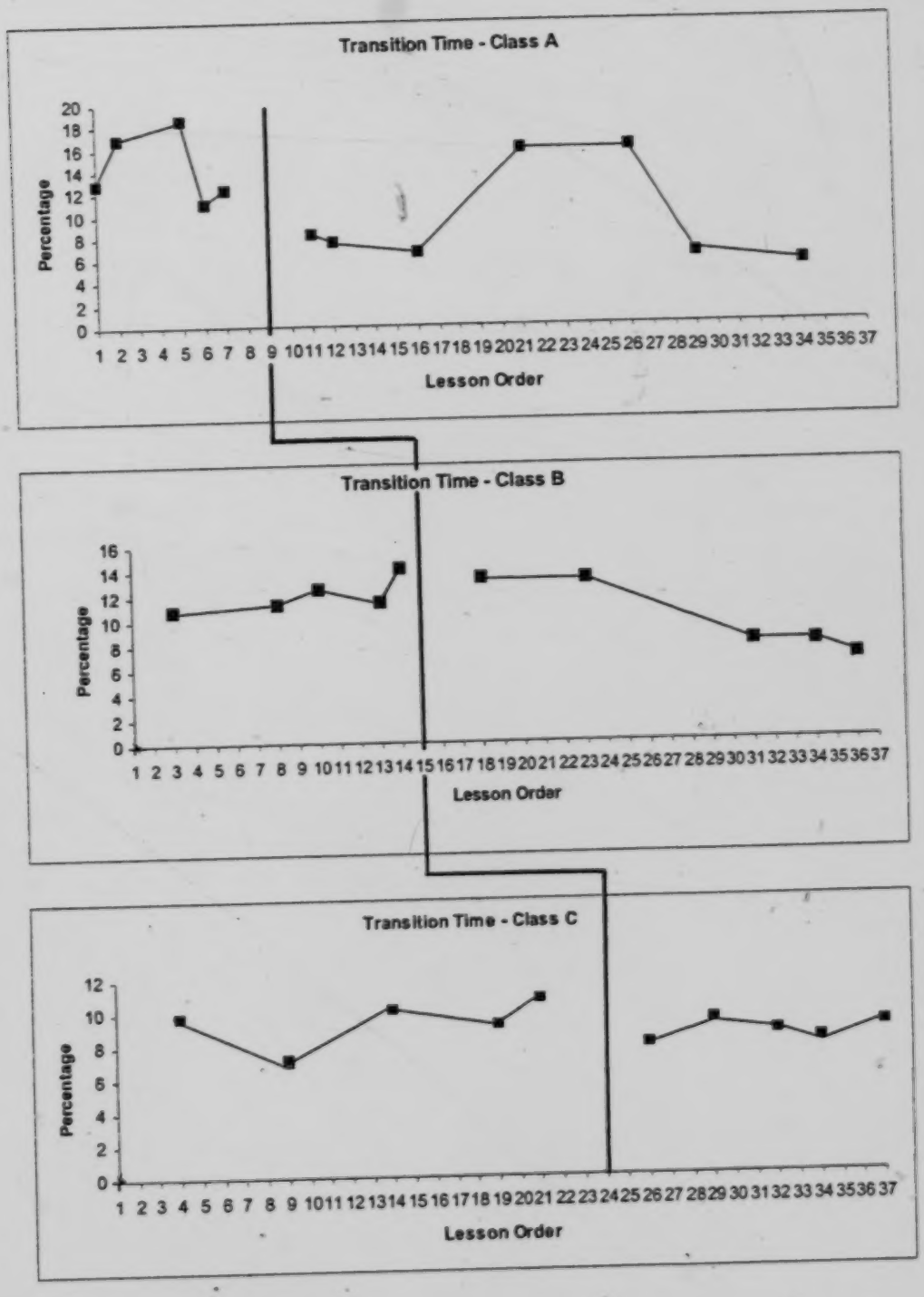

Figure 4. **Effects on transition time across multiple baselines**

(SD = 1.18). Once the teacher development program intervention was introduced, the mean amount of lesson time spent in transition activities decreased to 9.82% (SD = 2.84).

Figure 4 illustrates that there was a degree of overlap between the data points in the baseline and maintenance phases. Although, there is not an immediate change in the level of the data path after the introduction of the intervention strategy, changes in the trend are visually evident. Figure 4 illustrates that the trend of the baseline data path is upward, while the trend in the data after the introduction of the intervention strategy is downward. Although the first two postintervention data points are within the bandwidth of the baseline phase, the last three data points continue the downward trend beyond the baseline phase data bandwidth and produce a change in trend that is not evident during the baseline phase.

Analysis of baseline data for Class C indicated that the mean percentage amount of lesson time spent in transition activities was 9.34% (SD = 1.24). After five lessons the teacher development program intervention strategy was introduced, following the introduction of the intervention the mean amount of time spent in transition activities in a lesson decreased slightly to 8.58% (SD = 0.53).

Figure 4 illustrates that the postintervention data trend has less variability than the data during the baseline phase, however both sets of data points lie within similar bandwidths. Hence, providing a set of data that is very similar both pre- and postintervention.

In summary, although Class A experienced little change after the introduction of the intervention strategy, Classes A and B did experience a change in trend.

However, the effects of this change are not entirely clear as data points do overlap between pre- and postintervention.

Effects on Management Time

The effects on management time are illustrated in Figure 5. Analysis of the data indicated that, during the baseline phase of the study for Class A, the mean percentage amount of lesson time spent in management activities was 7.56% (SD = 1.98). After the fifth lesson, and the introduction of the teacher development program intervention, the mean percentage amount of time spent waiting in a lesson decreased to 2.34% (SD = 1.69).

Figure 5 illustrates that although one data point in the postintervention phase of the study does overlap with the bandwidth of the scores in the baseline phase of the study, the postintervention phase data points are generally at a lower level than during the baseline phase. Although scores in two lessons during the postintervention phase are at the minimum 0% level, there was not a clear trend in the data. However, it should be noted that the data does differ after the introduction of the intervention strategy with the data path being at a lower level than those in the baseline phase.

Analysis of Class B data indicated that during baseline phase of the study the mean percentage amount of lesson time spent in management activities was 3.72% (SD = 1.79). After the fifth lesson, and the introduction of the teacher development program intervention, the mean percentage amount of lesson time spent in management activities decreased to 2.50% (SD = 1.55).

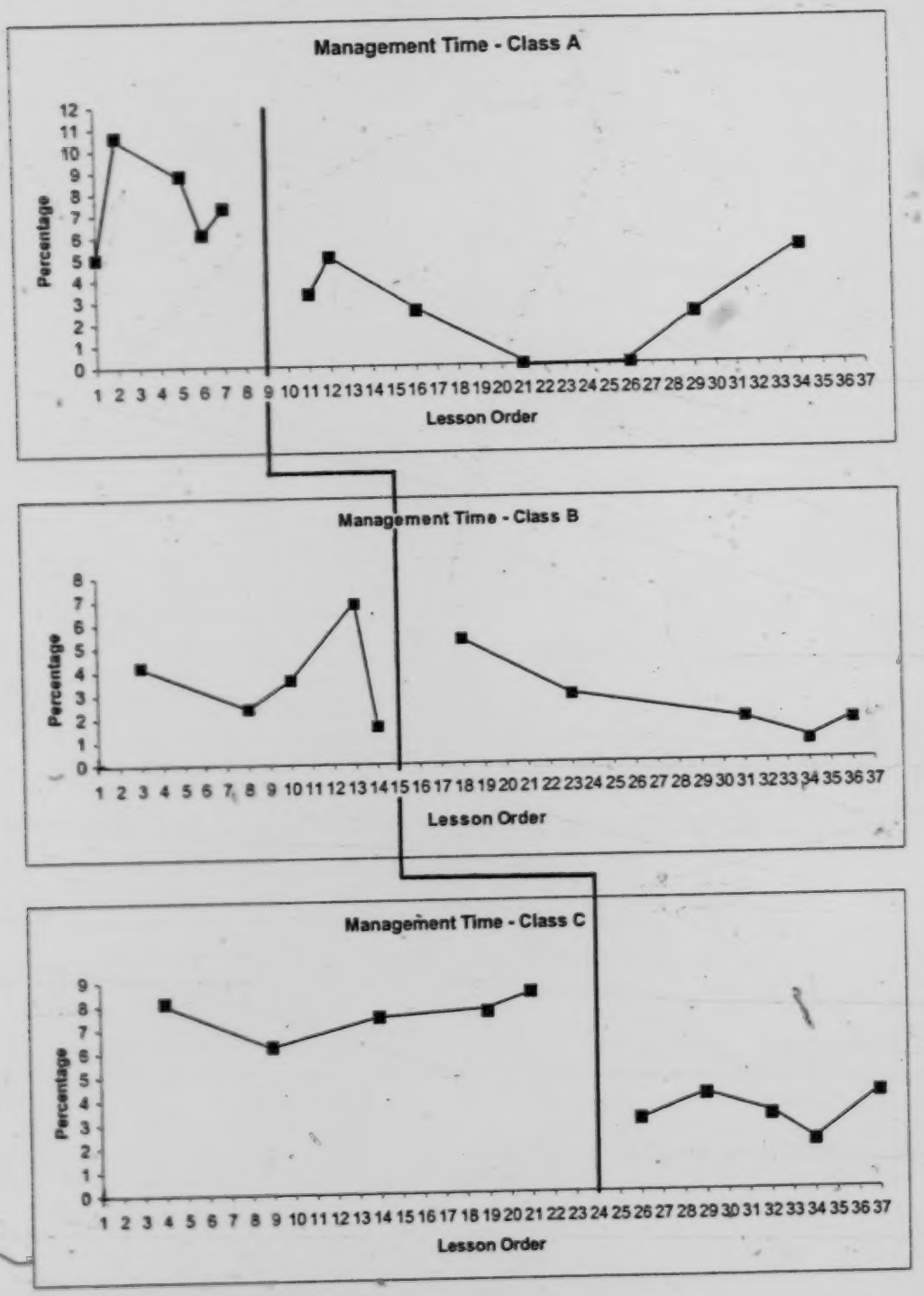

Figure 5. **Effects on management time across multiple baselines**

Although there is a decrease evident in the means reported, Figure 5 illustrates that the variability in the trend of the baseline phase data path makes any determination of trend in the data during this phase difficult. The postintervention phase has a general downward trend, however the last data point is at a level that does not continue in a downward manner therefore making the trend difficult to determine.

It should be noted however that during both phases of the study, baseline and postintervention, the percentage amount of lesson time spent in management style activities was low. The highest percentage of lesson time recorded during either phase was only 6.80% of the lesson.

For Class C, baseline phase data produced a mean percentage amount of lesson time spent in management activities of 7.54% (SD = 0.76). After the introduction of the intervention, the mean percentage amount of lesson time spent in management activities in a lesson decreased to 3.22% (SD = 0.74).

Figure 5 visually illustrates that data points in the postintervention phase of the study do not overlap into the bandwidth of the scores during the baseline phase of the study. The baseline phase data path has a general upward trend, whereas, during the postintervention phase, the percentage score in the last lesson is at a level and direction that prevents a clear data trend. However, there is a visually clear difference between the data path levels during the two phases. The postintervention phase has a data path that is at a lower level than the level during the baseline phase. This change in the data path level clearly accompanies the introduction of the intervention strategy.

With regards to the effect of the intervention strategy on management time, all three classes experienced changes. These changes were in trend and/or level. It is

important to note that they occurred after the introduction of the teacher development program.

Effects on Amount of Time Spent in Inappropriate Activity

The effects on the amount of time spent in inappropriate activity are illustrated in Figure 6. Analysis of Class A baseline data produced a mean percentage 1.08% (SD = 2.16) of inappropriate activity time. After the teacher development program intervention was introduced to the teacher of Class A, the mean percentage amount of inappropriate activity time in a lesson decreased to 0%.

However, Figure 6 illustrates that the reported means for each phase of the study do not necessarily indicate the trend or the level of the data. There is a large degree of similarity in the scores during the baseline and postintervention phases of the study. It is important to note that activity inappropriate time was at the minimum amount of 0% for all but one lesson. This one lesson accounted for the difference between the reported means of each of the two phases.

Analysis of the baseline data for Class B indicated that the mean percentage amount of lesson time spent in inappropriate activity was 0.90% (SD = 1.10). After the teacher development program intervention was introduced to the teacher of Class A, the mean percentage amount of inappropriate activity time in a lesson decreased to 0% (SD = 0.00).

Similar to Class A, the reported means for each phase of the study do not provide for an accurate indication of the level or trend of the data path. Scores during the baseline and postintervention phases of the study had some similarity. Activity inappropriate time was at the minimum amount of 0% for all but two lessons during the

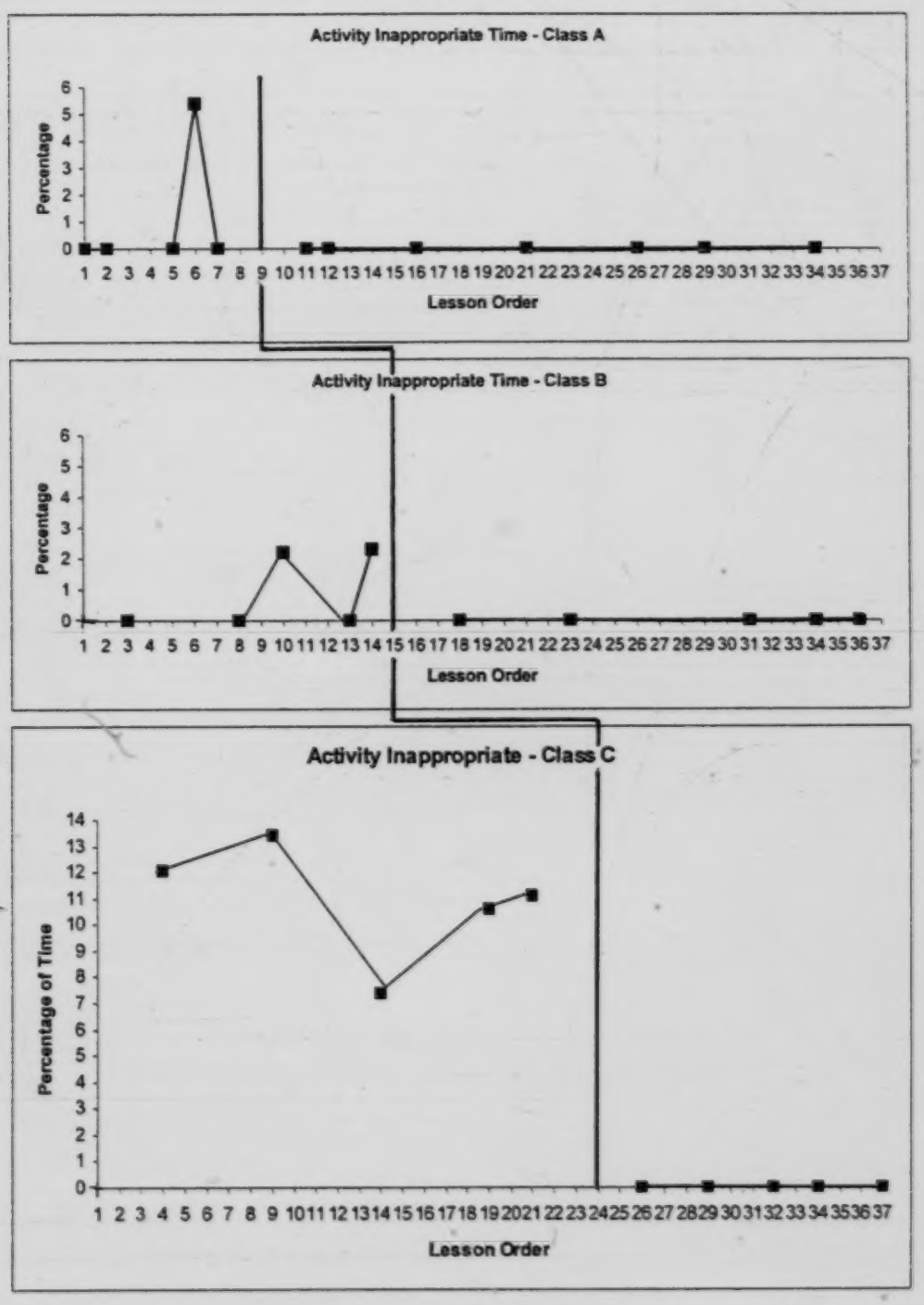

Figure 6. **Activity inappropriate time across multiple baselines**

two phases and that it is these lessons during the baseline phase that accounted for the difference between the reported means of each of the two phases.

Analysis of the baseline data indicated that the mean percentage amount of inappropriate activity time for Class C was 10.92% (SD = 2.00). After the teacher development program intervention, the mean percentage amount of inappropriate activity time in a lesson decreased to 0%.

Figure 6 illustrates that, although there is a degree of variability in the data path trend during the baseline phase, the individual lesson scores indicate a high level of lesson percentage time allotted to inappropriate activity. However, there is little similarity in the data path between the two phases of the study. Activity inappropriate time was at the minimum amount of 0% for all lessons during the postintervention phase of the study. It is important to note that this change in level and trend in the data coincided with the introduction of the intervention strategy.

As illustrated in Figure 6, the effects of the intervention strategy are clear. After the introduction of the teacher development program inappropriate activity was eliminated from all three-class environments. Although, this was not a major change for Classes A and B, it was a particularly positive change for the Class C environment where inappropriate activity was most evident during the baseline phase.

Effects on Amount of Time Spent Receiving Information

The effects on the amount of lesson time students spent receiving information are illustrated in Figure 7. Analysis of Class A baseline data indicated that the mean percentage amount of time that students spent receiving information per lesson was 37.60% (SD = 8.61). Following the intervention, the mean percentage amount of time

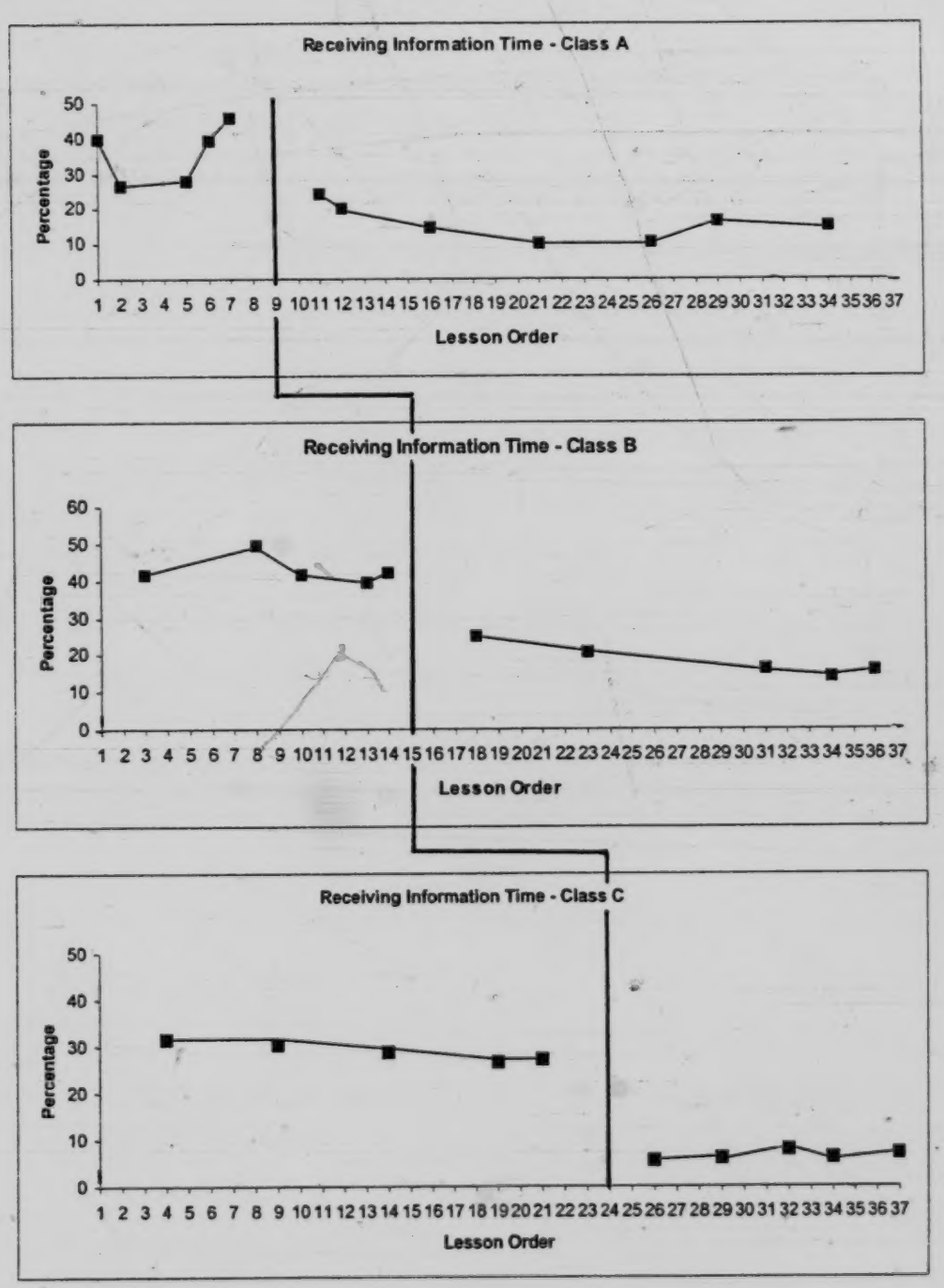

Figure 7. **Effects on receiving information time across multiple baselines**

spent receiving information per lesson decreased to 15.93% (SD = 4.59). Figure 7 illustrates that there is a visually clear change in the level and the trend of the data that accompanies the introduction of the intervention strategy. Although there was a degree of variability in the amount of time spent receiving information in each lesson, there is no overlapping of any scores between the baseline and postintervention phases. A general downward trend of the data is evident in the postintervention phase of the study.

The baseline data indicated that the mean percentage amount of lesson time that Class B students spent receiving information was 42.86% (SD = 3.41). Following the introduction of the intervention strategy, the mean percentage amount of time spent receiving information per lesson decreased to 18.28% (SD = 3.91). Figure 7 illustrates that there is a clear difference in the data path level between the two sets of scores in the baseline and postintervention phases. The data points in the two phases of the study do not have any overlap of bandwidth. There is also a change in the trend of the data path. The postintervention phase has a clear downward trend that is not evident during the baseline phase. Figure 7 also visually demonstrates that the change in the level and the trend of the data path clearly accompanied the introduction of the teacher development program intervention.

The baseline data indicated that the mean percentage amount of time that students in Class C spent receiving information per lesson was 28.82% (SD = 1.88). Following the introduction of the intervention strategy, the mean percentage amount of time spent receiving information per lesson decreased to 6.48% (SD = 0.82). Figure 7 illustrates that although there was somewhat of a downward trend in the data during the

baseline phase, there is a marked visual difference in the level of the data path that accompanied the introduction of the intervention strategy. It is visually evident that the scores during the postintervention phase are considerably lower than during baseline and that the marked difference in the data level was immediately after the introduction of the intervention strategy.

With regard to the amount of time students spent receiving instruction during their physical education lessons, it is visually clear that all three classes experienced a positive change in trend and level after the introduction of the teacher development program.

Effects on Time Engaged in Appropriate Activity

The effects on the amount of time students spent engaged in appropriate activity is illustrated in Figure 8. The analysis of the baseline data for Class A indicated that the mean percentage amount of lesson time that students were engaged in activity during their lessons was 25.8% (SD = 3.15). A mean of 68.18% (SD = 3.15) was recorded after the introduction of the teacher development program intervention. Figure 8 illustrates a clear difference in the level between the scores of the two phases of the study. It should be noted that the data path also has a relatively stable trend both pre- and postintervention. No overlap of scores was present and it is visually evident that the change in level of the data accompanies the introduction of the intervention program.

For Class B, the analysis of the baseline data produced a mean percentage amount of lesson time that students were activity engaged of 29.70% (SD = 1.20). However, a mean of 68.46% (SD = 9.46) was recorded after the introduction of the

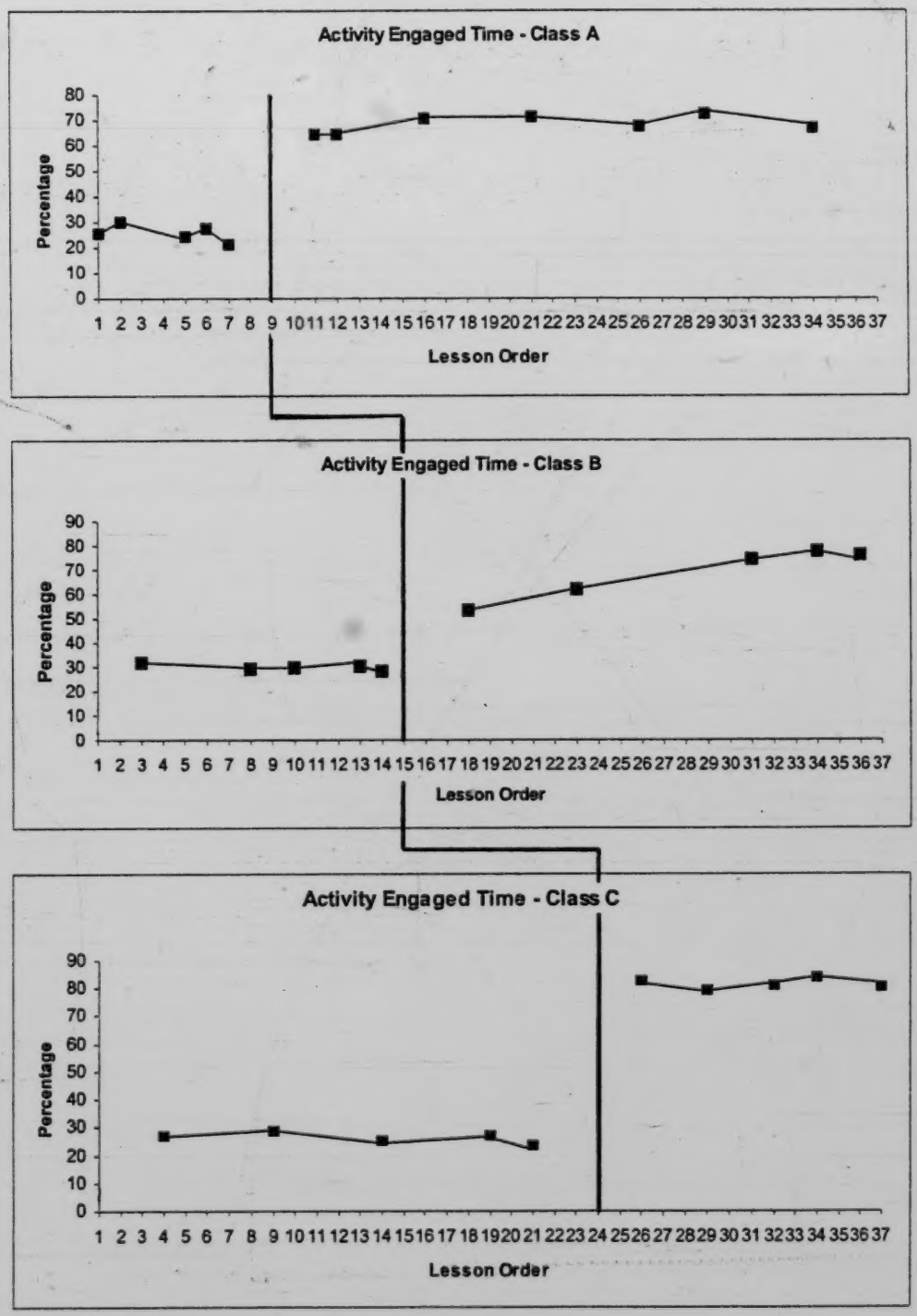

Figure 8. **Effects on activity engaged time across multiple baselines**

teacher development program intervention. Figure 8 illustrates that there was a distinct difference between the percentage scores during the two phases of the study. No overlap of scores between the two bandwidths was present and the change in the level and trend of the data path accompanies the introduction of the intervention program. There is an immediate change in data path level after the intervention introduction and the postintervention phase data path has an initial upward trend and holds at a high level. The difference between the two sets of data is clearly visible.

Baseline data for Class C indicated that the mean percentage amount of time that students were engaged in activity was 25.96% (SD = 1.83). An increased mean of 81.06% (SD = 1.79) was recorded after the introduction of the teacher development program intervention. Figure 8 shows a clear difference between the data scores during the two phases of the study. The data paths have little variability and there is no overlap of bandwidth present between the two phases of the study. Figure 8 also demonstrates that there is a clear change in the level of the data path between the two phases of the study and that the change in the data path accompanies the introduction of the intervention program.

Postintervention, all three classes experienced a positive change in trend and level. Of the three classes, Class C experienced the greatest change in level. It is important to note that the changes clearly coincided with the introduction of the teacher development program.

Effects on Amount of Time Engaged in Off-Task Activity

Figure 9 illustrates the effects of the intervention strategy had on the amount of time that students were engaged in off-task activity. Analysis of Class A baseline data

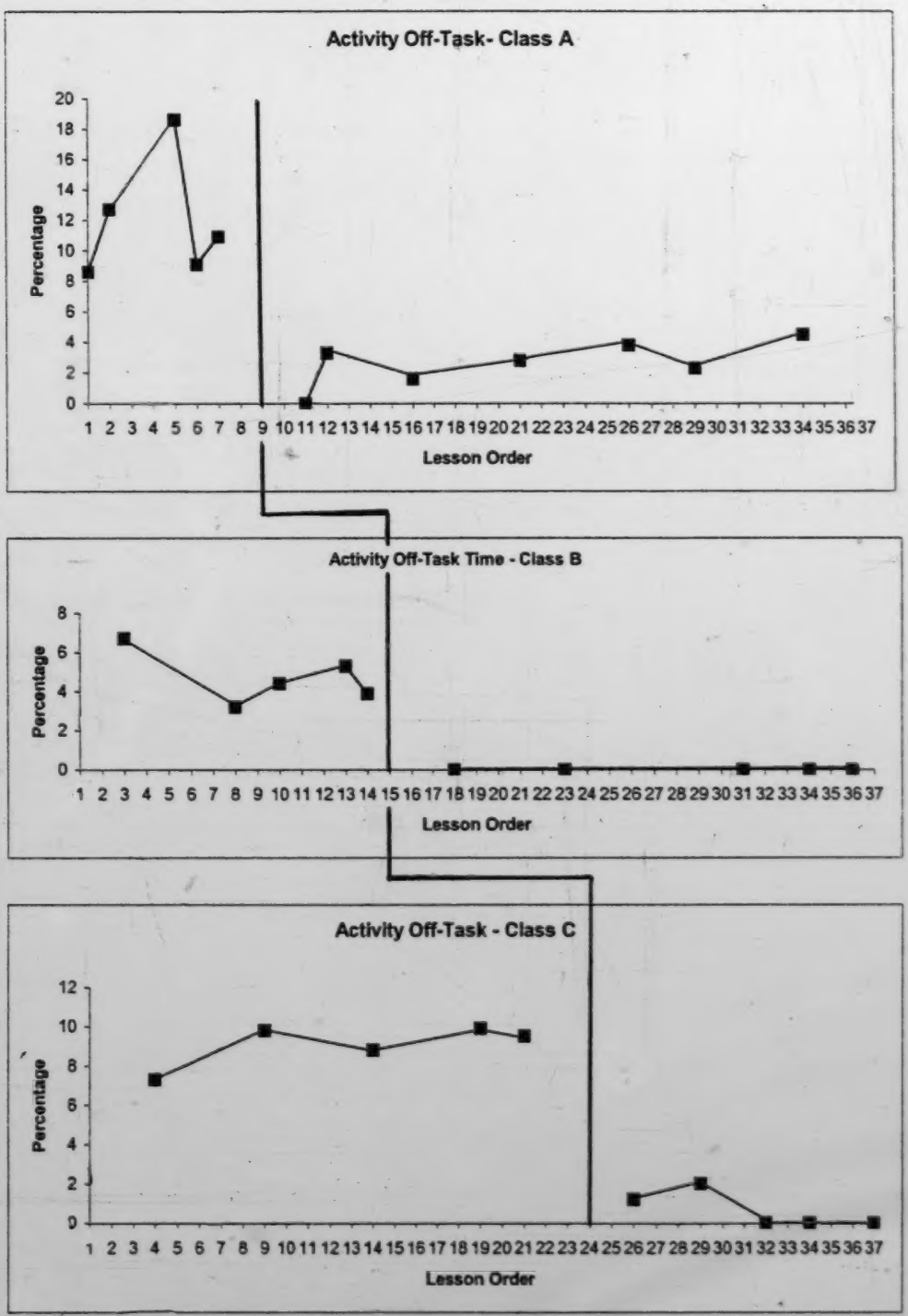

Figure 9. **Effects on activity off-task time across multiple baselines**

indicated that the mean percentage amount of time per lesson that students were involved in off-task activity was 11.98% (SD = 3.61). Following the introduction of the intervention strategy, the mean percentage of off-task activity time in a lesson decreased to 3.19% (SD = 1.64). Figure 9 visually demonstrates that a change in the level of the data accompanies the introduction of the intervention strategy. The postintervention phase has a consistent stable data path trend, of a narrow bandwidth, and is at a low level unlike the baseline phase.

Class B baseline data analysis indicated that the mean percentage amount of time per lesson that students were involved in off-task activity was 4.70% (SD = 1.21). Following the intervention, the mean percentage of off-task activity time in a lesson decreased to the lowest level possible of 0% (SD = 0.00). The difference between the sets of scores in the two phases could not have been greater in this circumstance (see Figure 9). Although the amount of off-task activity is not at a high percentage level during the baseline phase, the absence of any off-task activity in any of the five postintervention lessons is both noteworthy and visually clear. It is also important to note that this change in the level and trend of the data path occurs with the introduction of the intervention strategy.

For Class C, analysis of the baseline data indicated that the mean percentage amount of time per lesson that students were involved in off-task activity was 9.06% (SD = 0.96). Following the intervention, the mean percentage of off-task activity time in a lesson decreased to 0.64% (SD = 0.82). Figure 9 illustrates that there is a notable visual difference between the two phases of the study. The baseline phase scores have an upward trend toward a high percentage amount of off-task activity in the physical

education lessons. After the introduction of the intervention strategy, there is an immediate change in the level of the data path. This level in the postintervention phase is lower than the level found during the baseline phase. The postintervention phase has a narrow bandwidth with a fairly stable trend that decreases to the minimum level of 0% for the last three lessons of the phase.

Figure 9 clearly shows that the introduction of the teacher development strategy was accompanied by a change in level and trend in all three classes. This was particularly so for Classes B and C.

Summary of Findings on Student Behaviour

With regard to this study, Figures 3 through to 9 clearly illustrate that changes in student behaviour for each class occurred after the introduction of the intervention strategy. When student behaviour in Class A changed after the introduction of the teacher development program, changes in Class B and Class C student behaviour were not evident. Likewise, student behaviour changes after the introduction of the teacher development program in Class B and Class C were not accompanied by behaviour change elsewhere.

Therefore, in this study, the changes noted in student behaviour (see Figures 3 through to 9) can be attributed to the intervention strategy, as any trend and level changes in the behavioural variables accompany the introduction of the teacher development intervention strategy and similar changes are not seen in subsequent teaching environments. Therefore, extraneous variables such as time can be ruled out and changes in student behaviour can be attributed to the intervention strategy.

When considering each of the variables separately, the effects of the teacher development program were clearer for some rather than others. The effects on wait time were not consistent across all three classes. Although Classes B and C experienced very positive changes, Class A data were not as clear. With Class A, wait time was reduced but a consistent trend was not achieved. However, it is important to remember that wait time percentages were relatively small in each class although there was a lack of consistent trend found in Class A, the data values did reach the lowest possible level of 0% on four occasions after the introduction of the intervention strategy. Transition time was possibly the one variable that experienced the least amount of change. This may be due to transition time being a necessity for progression of a lesson and an important component of any lesson. Also, transition times prior to the introduction of the intervention strategy were not particularly high, making positive change in this variable difficult to achieve. Similar to the wait time variable, management time also experienced some inconsistency. Once again, management time percentages were small in each class. Although there was a lack of consistent trend found in Class A, the data values are still small across all three classes after the introduction of the intervention strategy and positive changes in trend and/or level are visually evident. With regard to the other variables, changes of level and trend were very clear and pronounced. Inappropriate activity, receiving instruction, engaged in activity, and off-task time, all experienced positive changes and the extent of these changes were visually most evident.

Students' Opinions About Their Physical Education Lessons

Six students from each of the three classes were randomly chosen to provide information concerning their opinions of their physical education lessons. Questions were provided to the students prior to the introduction of the intervention program and at the conclusion of the study to determine if any changes in opinion had occurred. Students, in a group setting, were asked to respond to the following series of questions.

1. What do you think of your physical education lessons?
2. What makes a good physical education lesson?
3. How would you describe your physical education lessons?
4. What kinds of things do you like to do?
5. How much time do you have for physical education lesson?
6. How do you spend your time in physical education lessons?
7. When do you do your best in your physical education lessons?

What do You Think of Your Physical Education Lessons?

Opinions of students in Class A. Prior to the introduction of the intervention program, the six Grade 4/5 students all agreed that their lessons were "…a lot of fun" and that they "…enjoyed themselves". Student #1 suggested that the lessons were "….a lot more fun than anything else that we do in school!" Student # 3 stated that lessons were "…good, but sometimes we do a lot of stuff that is the same each day".

At the conclusion of the study, these same six students responded that their lessons were different from earlier in the study. Student #1 responded that lessons had "…changed", student #2 described the change as "…we get to do things in groups more now", and student #3 suggested that "…groups are good". Student #3 then further

stated that "...we use task cards in our groups and it helps us know what to do rather than having to watch what the others are doing like we did before". Student #4 thought that, "...working in groups gives me lots of ideas, different ideas". Student #5 thought that lessons had changed because "...when we come into the gym we get down to things straight away and not do boring stretches" and student #6 responded that "...we spend less time watching just one student showing us what to do or (Teacher A) doing stuff, we don't seem to waste as much time".

Opinions of students in Class B. Class B was a grade 2 class. The six students, three boys and three girls, provided responses similar to those given by the students from Class A. However, the difference in age was most apparent in the length and depth of the answers provided in response to each question. Students agreed that their lessons were "...fun", "interesting", "triple fun", and "cool". Student #1 stated that the lessons were "…. fun doing games" and student #2 stated that lessons were "...fun, things to do".

At the end of the study, similar to the students in Class A, the students from Class B stated that their lessons had changed from earlier in the study. Student #1 responded that their lessons "...are different", students #3 and #5 described that lessons now consisted of "...doing more things not just stretching like we used to", and student #2 suggested that the class was "...doing more different things rather than talking or listening or sitting".

Opinions of students in Class C. In Class C, a grade 1 class, the six randomly chosen students consisted of three boys and three girls. Responses from the six students to the questions asked were quite similar to each other. Also, as in the case of Class B,

the grade level of the students in Class C meant that the responses, at times, were quite short and lacked considerable detail.

It is worth noting that, unlike in the previous classes, none of the students referred to their physical education lessons as fun. The students described their lessons through descriptions of the types of things that they did in each lesson, such as "…I like gymnastics", "…I like jumping jacks", "…playing with stuff like balls is the best", and "…games with balls" were all listed as what the students thought of their lessons. Despite attempts to solicit more information, the students could not further describe their experiences. Student #1 seemed to explain how the group was thinking when stating that "…exercises are the best, I love exercises, I wish we could do exercises all the time!"

At the conclusion of the study, the students from Class C clearly believed that their lessons were quite different from those earlier in the study. Generally, they sensed a change in their lessons. Student #1 responded that lessons were "…busier", student #2 described the change as "…we have more stations now and we do harder things", and student #3 stated, "…we do more things, I get sweaty". Student #4 thought that, "…we have new stations that are harder". Student #5 knew that lessons had changed because "…I get very tired and hot every lesson" and student #6 remarked, "…we do more things. We are learning new things". All five of the other students agreed with this notion and made statements such as, "…cool, new things", "…things that we didn't do before", "…harder stuff too", and "new fun things".

Summary. The responses from the children in all three classes clearly demonstrate that they had noticed a difference in their physical education lessons as the

study progressed. Lessons had become more active than previously, students were engaged in new activities, and time was being well utilized. These changes were viewed, by the students, to be positive and beneficial to both the lesson and to them.

What Makes a Good Physical Education Lesson?

Opinions of students in class A. Responses to this question drew a little more variation than the previous question, however most responses included a reference to "fun". Student #1 remarked that a good lesson consisted of "…lots of fun activities"; all the other five students quickly agreed upon the importance of this factor. Student #2 suggested that "…different activities, doing new fun things" and student # 5 stated that "…imaginative work" were important. Lastly, student #6 remarked "…gym was good when learning is made to be fun".

At the conclusion of the study, the students' responses to this question featured a common thread. Student #2 stated that a good lesson was when "…we are all doing things and that each lesson is something new to learn". The other five students quickly agreed with this statement and added other such descriptors as "…learning something new", "…showing that I can do things", "not sitting around", and "…keeping busy and moving everywhere". Clearly, the notion of being active and learning was noticed by the students and was viewed in a positive manner. The idea of a good lesson changed from fun to learning and being active.

Opinions of students in Class B. Responses to this question were somewhat limited. The students' answers concentrated on the actual activities that the students liked. "…asteroids", "…dodge ball", "…mirror, mirror", and "shadow" were clear

favourites amongst the six students. Despite attempts to gain further insight, the students did not provide any further clarification.

A much more common theme of response to this question was provided by the students at the conclusion of the study. The theme of having the time to practice was a common thread amongst all the responses. Student #1 stated that a good physical education lesson was when "...we are doing things, much more than we used to". Students #4 and #5 agreed with this assessment and student #2 further commented "learning was fun when we get to do things". Lastly, student #6 stated that lessons were best when "...we have time to practice lots". All of the other students agreed with this assessment and began to describe their lessons as such, "...it is fun when we have lots of turns", and "...when everyone has a turn it is fair and I like to try everything".

Opinions of students in Class C. Prior to the introduction of the teacher development program, the majority of the responses from the students of Class C to this question included a reference to "fun and/or playing". Student #1 remarked that a good lesson consisted of "...lots of fun and stretching", student #2 thought that "...running laps was fun", and student #3 agreed and further added "...as long as we can jump too". Students #4, #5, and #6 all agreed that "...doing lots of things with balls and running and fun and playing" were essential to a good physical education experience.

At the conclusion of the study, student responses to this question certainly had a common thread. Students all felt that "...lessons that are lots of fun, but doing new things" was important for a good physical education lesson. Student #6 identified an

issue that was supported by all of the other five students too, "we only sit for one or two minutes now, we used to sit for a long time in our old lessons".

Summary. The responses from the students to this question differed from pre- to postintervention. Prior to the introduction of the teacher development program students tended to view a good lesson to be related to a particular activity or to having fun. After the introduction of the teacher development program, students generally seemed to believe that good lessons consisted of such things as practice, learning, and being active rather than just having fun or participating in a particular activity.

How Would You Describe Your Physical Education Lessons?

Opinions of students in Class A. Prior to the intervention, all six students responded to this question in a unified manner. Basically, they came to agreement amongst themselves as they described their typical lesson. It was agreed that a typical lesson consisted of "…warm-up stretches", "…a main activity", "…cool-down stretches", and a "…word-wall activity" when leaving the gymnasium.

At the end of the study, all six students responded to this question in a unified manner. They agreed that their typical lesson consisted of "…less stretching", "…we now start doing things straight away", "…we start doing things quicker", "we have more time to do things", and "…we do stretching and cool-down while (Teacher A) is telling us what we will be doing". Student #4 seemed to summarize the feelings of the group when remarking that "…we still do all the things that we did before, like stretching, main activity, and word wall stuff, it is just that we seem to do them better and have more time, gym is a lot of work now!". These responses were very different from the earlier statements provided prior to the intervention. The students seemed to

notice and value that their time had become more productive in their classes than previously.

Opinions of students in Class B. Prior to the introduction of the teacher development program, all six students responded to this question in a very similar manner. Basically, they came to an agreement amongst themselves as they described their typical lesson. It was agreed that a typical lesson consisted of "…stretches, yoga stuff", "…moving activities, animal stuff or games", and "…more stretches at the end".

At the conclusion of the study, after the introduction of the teacher development program, the six students still responded in a very similar manner. However, a different theme emerged in their responses. There seemed to be a common agreement amongst them that the lessons were "…the *funnest* and tiring" since the introduction of the intervention program. Comments such as "...we need lots of energy now", "I get tired much more now", " I need more drinks at the water fountain", and "I get tired but I like it because we are doing so much, we don't sit around like we used to" were provided to illustrate what the physical education lessons were like.

Opinions of student in Class C. Preintervention, the students started to answer this question individually but soon began to develop a group consensus and collectively responded that their lessons consisted of "…running laps", "doing stretching stuff or exercises", "…games", and a "…last stretch before we go back to the classroom".

Postintervention, once again all six students responded to this question in a unified manner. Responses concentrated on the notion that their lessons had changed and that they were being asked to do more things. They suggested that their typical

lesson consisted of "…lots of activities", "…difficult stuff", "stations and games where we run and get hot and sweaty" "…less sitting and more doing things".

Summary. The responses to this question again differed from pre- to postintervention. After the introduction of the teacher development program, the students had noticed that their lessons had become busier; with less time waiting or sitting and that they had more time to be active than previously.

What Kinds of Things Do You Like to Do?

Opinions of students in Class A. Prior to intervention, the students provided quite a variety of responses to this question. Student #1 suggested, "…sports are the best", student #2 thought, "…gymnastic activities are cool", student #3 liked "…stretches", student #4 "…things that are fun and adventurous", student #5 remarked that "…I like doing the cool down activities, all the stretches most of all", and student #6 added that "…anything active is always fun and the best".

After the intervention, the students still provided a range of responses to this question. However, common amongst a number of the responses was the idea that the students still enjoyed their physical education lessons. Student #1 suggested, "…group activities", student #2 stated, "…having time to really do things", student #3 remarked "…doing things straight away", student #4 thought "…things that are fun and we all get sweaty", student #5 remarked that "…it is fun when we get to do things as partners", and student #6 further added that "…when we do things in a group it is so more fun!"

Opinions of students in Class B. The students provided quite a variety of responses to this question prior to the introduction of the teacher development program.

Student #1 suggested, "…using equipment", student #2 thought, "…doing exercises", student #4 "…when we get out the mats", student #5 remarked that " …I like learning cool things", and student #6 added "…learning how to play games".

Postintervention, student #1 thought that, "…doing really active things is the best"; student #2 stated, "…doing things like running, jumping, and getting better at throwing"; student #3 remarked "…fun games are best"; student #4 thought that "…lots of activities are best"; student #5 remarked that "…it's fun when we all get to try things"; and student #6 further added that "…I like throwing, I can throw as good as my dad now!"

Of particular note, from the two sets of comments was that the postintervention comments seemed to focus more on particular skills and improvement. This was a change of focus from preintervention comments that tended to focus more on activities.

Opinions of students in Class C. Responses to this question were quite similar amongst the six students. One student would suggest an activity and the others would agree that they too liked the activity. The range of activities mentioned were "…stations", "exercises", "…stretching and exercises", "…running", "…doing lots of laps", and "…floor hockey.

At the postintervention stage, the students provided a number of responses to this question. Student #1 suggested, "…I like running"; student #2 stated, "…playing games is fun"; student #3 remarked "…doing stations, new stations each lesson"; student #4 thought "…the big part of the lesson is the best, we have lots of time to try new things"; student #5 remarked that "…I like to do new things"; and student #6 agreed and further added that "…new things are best when you have a lot of practice".

When comparing the pre- and postintervention responses of the students in Class C, specific activities where mentioned at the preintervention stage, while postintervention responses identified a feeling of newness. This newness was something that the students seemed to enjoy and value.

Summary. In general, the responses from the students in all three classes differed from pre- to postintervention. Postintervention, the students were happy with the changes that had occurred in their lessons and seemed to note that there was a new feeling to the lessons and that particular skills were being improved upon. Possibly the most pleasing aspect from the responses was the issue of group work with the Grade 4/5 students. The postintervention introduction of group activity to the oldest students was a direct change from information and discussion provided during the teacher development program. The responses from the students of Class A clearly indicated that Teacher A had changed her teaching from her participation in the intervention program to accommodate group activity and this was a major factor of enjoyment for the students.

How Much Time Do You Have for Physical Education Lessons?

Opinions of students in Class A.

As in the case of some of the earlier questions, all six students came to a joint agreement about the amount of time provided for physical education lessons. They expressed that they received "…three lessons each week" and that each lesson lasted "…about thirty minutes". However, student #3 stated that "…sometimes p.e. is cancelled because of other school things" and the other students started to compile a

list of reasons such as, "…assemblies", "…performances", "…when we have to finish math or other important work", and "…when we haven't been very good".

All six students agreed about the amount of time provided for physical education lessons. They stated that they still received "…three lessons each week" and that lessons lasted "…about thirty minutes, sometimes a little longer". However, they proceeded to suggest that they received more time in the lesson itself through comments such as "…we have time to do more things now", "…we're always busy", "…we have lots of time to learn how to do things", and "…everyone gets an equal chance to try things now". It was also remarked by students #1 and #4 that "…we spend less time listening to (Teacher A) now; we get down to doing stuff like activities much quicker". This thought was quickly confirmed by the other students through comments such as "…yes, we don't waste as much time", "I like (Teacher A), she is nice, but she used to talk a lot, now she doesn't and it's better" and "…we do more things now, we just don't sit around".

The postintervention comments concerning the way time was spent in physical education lessons was the biggest difference between the two sets of responses. The students identified that their lessons had changed and that as participants they were busier and more active than during the preintervention phase.

Opinions of students in Class B. There was a tremendous amount of variability in the student's responses to this question during the preintervention phase. The reported time varied from "…20 minutes" through to "…60 minutes" with such other time amounts as "..39 minutes" and "…44 minutes" also suggested. However, as a group they agreed that lessons were shorter on days when "…kids fooled around",

"...when we have special school things", "when we have to get our shoes on or off and have to wait for everyone", and "...when we have special projects to finish off".

Postintervention responses were similar to preintervention responses. The students' responses were quite varied with answers ranging from 25 through to 60 minutes. Interestingly, with regard to how often lessons occurred, student #1 stated that "...we go to gym more now, (Teacher B) likes gym more and we go all the time".

Understanding the concept of time and trying to identify the length of lessons was difficult for the students of Class B. Consequently, the responses did not offer a lot of insight. However, their comments that classes were cancelled during the preintervention phase but were not postintervention were noteworthy.

Opinions of students in Class C. As in the case of Class B, the preintervention responses to this question were most varied. They estimated their lessons to be as short as "...10 minutes" to as long as "...2 hours". When asked how often the class had physical education each week, the students agreed with student #5 who stated that "...we go about two times a week, sometimes when it is hot outside we have gym outside on the swings and teeter-totter". There was also agreement with student #2 who suggested "...we don't get gym all the time, sometimes we have to finish our other work, like math or spelling, or reading". Other students quickly responded with some other reasons for why their class did not always have their scheduled physical education lessons, "...like when we are not lining up right", "...when someone is talking in class and we have to wait forever in line, sometimes we don't go we have to sit in our desks" and "I had to take my math to the gym once".

Postintervention, the students still could not identify how long their lessons were, guesses ranged from "…10 minutes" to "…45 minutes", however they were able to determine that they had "…p.e. more than last month" and "…everyone goes to gym now, no one is left back in the classroom with (teacher assistant)".

Considering the age of the students in Class C, their lack of understanding of the length of their lessons can be understood. Similar to the responses of students from Class B though, their comments concerning the manner that classes were missed or how students were excluded during the preintervention phase compared to postintervention were most interesting.

Summary. In light of the responses provided from the students, in would seem that this question was difficult to answer for the younger students involved in the study. However, the answers given, although off-topic, did provide important insight into the way that students are not always provided with physical education lessons. Comments from the preintervention phase clearly suggested that lessons were cancelled due to a wide range of reasons from unfinished work through to consequences for misbehaviour. Postintervention saw a change in this practice and students were not deprived of their physical education learning experiences. As the teacher development program included information concerning the importance of physical education to the overall development of a child, it would seem that, due to this new understanding, that the teachers had accordingly made changes to how they provided physical education experiences to their classes.

How Do You Spend Time in Physical Education Lessons?

Opinions of students in Class A. During the preintervention phase, the students, once again, provided a joint style response to this question. They agreed that their lessons normally consisted of "…ten minutes doing warm-up stretches", "…five minutes explaining things", "…ten minutes doing an activity like a game", and "… about five or ten minutes doing cool-down stretches".

Postintervention comments echoed some of the responses made previously by the Class A students. Student #1 suggested"…like we said before, we have time to try out how to do things", student #3 said that "…by working in partners or in threes we get to do so much more because your friends can help you out". Students #4 and #5 agreed with student # 6 suggestion that, "…our lessons are not so separate anymore, we kind of do things and everything rolls into one big lesson".

The identification of having more time after the intervention was a positive issue for the students. Changes made by Teacher A to her teaching and her lessons provided the students with time to work together and to achieve tasks.

Opinions of students in Class B. The students provided a joint style response to this question during the preintervention phase of the study. They agreed that their lessons normally consisted of "… some stretching or running", "… a game", and "…some yoga stretches".

Postintervention, Student #6 remarked that lessons were "…more busy and (Teacher B) knows what to do". The notion of being busy was quickly agreed upon by the other five students. This was further illustrated by student #4 who suggested, "…we

don't stop all lesson" and student #2 who stated, "...lessons are fun because we're always doing stuff".

After the introduction of the intervention, the students in Class B noted that their lessons had changed. Once again, similar to comments from other questions, they mentioned that their lessons had become far more active than previously.

Opinions of students in Class C. Similar to the responses provided by the other classes, the students stated that their preintervention lessons normally consisted of "…running lots of laps", "…talking about what to do", "…playing a game or doing exercises", and "…running some more laps or doing exercises".

However, postintervention, Student #4 responded that "…(Teacher C) does not let us stop, we go, go, go" and student # 2 suggested that the students were like "…the *Energizer Bunny*, going, going, going!" All the students thought that this statement was funny but true, Student #1 added that "...we have lots of moving around, but I like that", to which, again, there was a universal agreement from all the students.

Summary. Once again, change was detected by the students. The students identified their lessons to be much busier during the postintervention phase than in the preintervention phase.

When Do You Do Your Best in Physical Education Lessons?

Opinions of students in Class A. Preintervention, "…doing gymnastics" was selected by student #2; "…when I can do things well" was chosen by Student #5 and was quickly agreed upon by all of the other students as being very important. Students #1 and #6 suggested that "…group activities" were the way that they performed the best, and this idea was extended upon by all six students when it was suggested that

"...using our ideas", "...letting us choose the activities", and "...giving us choices" all helped them to perform their best in physical education classes.

Postintervention, the responses to this question were very clearly in favour of having lessons that allowed for "...doing group stuff', "...having time to do things", "...when we are working with friends who help us to learn how to do things better", "...when (Teacher A) has more time to help us", and "...like when we are allowed to choose the equipment we use or how to try things"

Opinions of students in Class B. The data collected prior to the introduction of the intervention strategy were quite limited in detail and tended to identify particular types of lessons or activities. Students #1 and #6 both suggested "...all the time", "...when I line up" was picked by Student #2, "...gymnastics" was thought of by student #3' "...stretching" by student #4, and "...games and sports" by student #5 as to when they performed at their best in physical education classes.

The postintervention responses to this question were very different from those provided preintervention. Student # 5 gained the group's approval when suggesting that it was "...easy to do my best when we get to try so many things and we have lots of time to practice". Student #4 in particular agreed with this sentiment and added that the issue of "...having equipment for each of us" was a critical feature of lessons.

The amount of time allowed for practice, the accessibility of equipment, and activity variation themes are clearly different than those identified in the preintervention stage.

Opinions of students in Class C. Preintervention responses from the students in Class C ranged from identifying specific activities through to having access to personal

equipment. Student #1 selected "...when we play things", "...when I play floor hockey" was suggested by student #2, and "...when we have our own equipment" was stated by student #3. The notion of having personal equipment was quickly agreed upon by all of the other students as being very important to their success too. Students #4, #5, and #6 suggested that "...when we are doing lots of things, new things" helped them to perform their best in physical education classes.

Postintervention, the responses from the students were more focussed but still had some similarity to those provided during the preintervention stage. The students were very clearly in favour of having lessons that involved "...doing lots of things", "...being active and doing lots of new things", and "doing new stuff for a long time", because it was felt by student #3 that it was "fun when we have lots of time to do new things, I think that I'm getting better at new things".

Summary. Students in all three classes identified having personal equipment and the time to achieve tasks as being important to their performance in physical education lessons.

Overall Summary of Changes in Student Views

As the student interviews were conducted pre- and postintervention it can be argued that the changes identified by the students were due to the teacher development program. Although it needs to be remembered that such issues as *testing* and *maturation* threats are limitations to pre- and postintervention testing, steps were taken to minimize the potential of these internal validity threats. For example, students were not informed as to what was actually occurring with their teachers or the stage of research work.

At times, student responses identified issues that were a part of the presentation and discussion in the teacher development intervention program. For example, the teachers were introduced to what a developmentally appropriate physical education program consisted of. Also, it was discussed how programs need to be developed and taught in a manner that recognizes the unique needs of the individual based on his/her cognitive, emotional and social, and physical needs. Having personal equipment and time for adequate practice was also another important component of the teacher development program. These issues were commented upon by the students during the postintervention interviews as being positive changes. An example of this was in the postintervention comments of the Grade 4/5 students. They enjoyed and valued activities that were group oriented. As the teacher development program included the understanding of developmental appropriateness, these comments support the idea that the teacher development program impacted the students.

Of particular note was that on a number of occasions, the students' responses at the conclusion of the study seem to suggest that they had begun to sense that their lessons had changed and that they viewed this change to be positive. The students identified that their lessons had, after the introduction of the Teacher Development Program, become more focussed on learning and practice. Seeing that the intention of the intervention program was to impact the student learning environment, comments referring to this issue are particularly noteworthy.

Changes in Teachers' Understanding and Teaching of Physical Education

All three of the teacher participants in the study were interviewed to gain their personal opinions of physical education, their thoughts on their physical education

lessons and teaching, and their perspectives on the teacher development program and the effective teaching model. In order to understand if any changes in opinion occurred during the duration of the research study, interviews were conducted at the onset and also at the conclusion of the study.

Teacher A

Background information about Teacher A. Teacher A was a female grade 4/5 teacher. Although Teacher A had a personal interest in physical activity, and "...enjoyed cultural dancing and playing team sports", she did not take any specialized physical education courses during her elementary school generalist teacher preparation program. Teacher A stated that "...physical education was not a focus at university and I've not taken any kind of professional development courses in physical education." Teacher A declared that she had spent most of her professional development opportunities involved in "...literacy or second language activities" as she felt that this knowledge would support her in gaining a permanent contract position.

Changes in her understanding and teaching of physical education. During the preintervention interview, Teacher A described her physical education teaching as the "...following of previously established units" or "...using a couple of lesson plan books" and felt that she was "still learning and evolving with physical education." She used provincial documents to support her planning but felt that she "...lacked resources to supplement my planning" due to the "...vastness of the curriculum" that was, at times, "...overwhelming."

When asked about developmental understanding, Teacher A could respond about developmental appropriateness in her classroom teaching but was not sure of its

application to the physical education domain, "…I'm not sure how it would work in my p.e. teaching…would I choose different equipment?" Effective physical education lessons were seen to be those where the students "…enjoyed their lesson…students were interested in the activities…met expectations", whereas unsuccessful physical education lessons were linked to "…student misbehaviour…student dislike of the activity…lack of expectations."

Responses during the postintervention interview illustrated several changes had occurred for Teacher A. Generally, she found that her understanding of physical education had changed. She believed that "…I've found several ways to approach learning outcomes…I am more confident…I learned about the *individual* in p.e." Teacher A also had begun to realize that planning before the lesson and what occurs in the lesson were linked, "…I am more focussed on linking my plans to what actually pans out in the class…I reflect on what worked…and what I do". Also, after lessons, Teacher A had now begun to reflect upon what she did or what she had planned that "increased the level of activity" in the lesson.

As a result of these changes, Teacher A also felt that her teaching had altered compared to the manner that she taught prior to her involvement in the study. She suggested that now her lessons "…flow, there is less transition time, less waiting, and more time to explore the p.e. skills and activities." She had also noted that students were "…more active. I see them collaborating on their own initiative. They stay on task easier when they are engaged."

Teacher B

Background information about Teacher B. Teacher B taught the grade 2 class. Teacher B did not have an interest in personal physical activity; her childhood experiences of physical education lessons had left her with a number of negative feelings about physical education. She had though taken a physical education curriculum and instruction course during her teacher preparation program. During her nine years of teaching she had taught the majority of the grades found in kindergarten to grade 12 school settings and had participated in approximately three half-day physical education professional development opportunities. These professional development opportunities had consisted of activities specializing in cooperative activities, gymnastics, and implementing the new provincial curriculum. Teacher B stated that she had concentrated her professional development opportunities during her teaching career on "…the more core subject areas rather than physical education, such as balanced literacy."

Changes in her understanding and teaching of physical education. During her preintervention interview, Teacher B described herself as "…self-taught, not familiar with the curriculum or the mechanics of how children move" and felt that she taught, " …what I know and I use handouts that I got from other teachers". When asked about her understanding of developmental appropriateness, Teacher B was not aware of its application to the physical education domain. Her only thought was that "…competitive games were not appropriate for young children and that creative dance worked well." When describing a successful physical lesson, Teacher B suggested that students would be "…having time to explore…be involved…motivated…happy" and

when considering an unsuccessful lesson, students would be "...hurt...not participating properly ...uninterested...off-task".

The postintervention interview indicated that Teacher B felt that participation in the study had caused her to reconsider her understanding and appreciation of physical education, "...I see it as being more important in the overall functioning of children at school in all subject areas...I see my role as an early educator as being very important now in the terms of the way children develop their sense of how they can achieve in physical education in the future." This change of thought was also reflected in the amount of time spent planning by Teacher B. Postintervention, she described her lessons as "...much more well planned and thought out...I am spending more time thinking about and planning lessons." Changes were also felt to have occurred in her teaching too, "...I talk less, the children are more active...they are more on-task, more involved in the lesson, tiring out more and are learning more than ever before". Also, Teacher B stated that she had begun to understand developmental appropriateness and had begun to use it in her teaching, " ...I'm much more aware of keeping activity levels high and having kids appropriately challenged at their level of ability."

Teacher C

Background information about Teacher C. Teacher C taught the grade 1 class. Teacher C's main hobby outside of her teaching position responsibilities was physical activity. She participated in numerous team sports, was involved in a fitness program, and swam on a regular basis. She did this personally and with her children. Teacher C had participated in a *Movement Education Minor* program during her teacher training program and had taken a number of professional development activities throughout her

career to help keep her informed of the subject area. The professional development activities included such sessions as cooperative activities, gymnastics, various team games, safety, fitness, and the implementation of the new curriculum.

Teacher C had been teaching for a period of 19 years, all at the elementary school level. During her years of experience she had mainly taught the early elementary school grade levels of grade 1, 2, and 3. During her career she had also been recognized as a teacher of excellence by the provincial education department, Alberta Learning.

Changes in her understanding and teaching physical education. In the preintervention interview, Teacher C indicated that she enjoyed teaching physical education, "...it doesn't feel like work...I like to do it." She described her level of knowledge as "...comfortable" and that her "involvement in sports helped tremendously" with her teaching. Although, she did state that her theoretical knowledge was "still being developed...and still needed more strategies". Teacher C used the provincial curriculum to plan teaching units and lessons. Also, professional development information was used to supplement plans and to provide some variety in lesson activities. Planning was normally done at the "beginning of a unit...and changed if need be...but normally plans stayed the same as I had planned at the start". Teacher C identified a successful physical education lesson as "...lots of time to practice...increase in student self-esteem...capable, confident students...students learning something new" and an unsuccessful lesson as "...students not on task...not enjoying themselves...bored...safety problems".

Postintervention, Teacher C also suggested that her understanding of physical education had changed due to being part of the study. She stated:

> I have gained a better understanding of the effects physical education has on a students' overall school performance. My thoughts of physical education are also changed in that I now treat it as a core subject, whereas I may not have before. I now feel that physical education has a very significant, vital role in a child's education and that this subject should never be compromised and that it should be incorporated into each and every school day.

Teacher C also believed that her teaching had changed, "…I feel that my teaching is more developmentally appropriate for my students and that the quality of…instruction has improved". Teacher C further acknowledged that she had "a much better insight and many more new ideas…I am now able to spend more individual time with each student to focus on his or her individual needs." Student behaviour had also altered according to Teacher C. Students were "much more active…noticeably more tired, visibly busy, skills are showing improvement now that they are provided with more time to be actively engaged." Another benefit was also identified, " there are no off-task or behaviour problems".

With regards to planning, Teacher C had become far more aware of the individual needs of students and how to make lessons more developmentally appropriate. She commented that she "…now makes sure that students have an activity…I use things such as task cards now to provide for a variety of skill levels…I plan the use of the gym space better now…and I plan to help individual students".

Summary

The responses from the three teachers clearly indicated that the teacher development intervention program had had a profound effect on their teaching. Each teacher remarked that positive changes had occurred and it was due to the information that they had received during the teacher development program. Their understanding of physical education, developmental appropriateness, and lesson construction had changed from prior to the program. Consequently, they also concluded that the learning environment that they provided their students had also been positively impacted. Lessons that mirrored the *busy, happy, and good* scenarios described by Placek (1983) had changed to lessons that were more meaningful, had student learning as a focus, and directed to individual student success.

Teachers' Opinions About The Teacher Development Program

Teacher A's Opinions

Teacher A described her overall experience of the teacher development program as "excellent…it was an excellent professional development activity" and commented "…I feel extremely lucky to have had this experience early in my career. The ideas and techniques have worked well with what I do in my classroom."

When asked about the usefulness of the teaching model, Teacher A was most enthusiastic about its application to her teaching, "…I feel very comfortable with the techniques and strategies that were proposed to me to try." Also, Teacher A had begun to use the model in other curricular areas of her teaching, "…I am thinking of ways to increase the amount of doing and thinking in all subject areas".

Teacher B's Opinions

Teacher B felt that the experience of being part of the teacher development program was "...very worthwhile, it has changed my teaching practice for the better." Teacher B also remarked that she felt that the peer coaching experience was a positive experience for her, "...I never felt I was being criticized. Information was very clear and helpful to me and was presented in a clear, concise manner...gains I made in my teaching were pointed out and celebrated." Teacher B summarized her involvement in the study as "10/10! Very worthwhile!"

When asked if Teacher B would continue to use the effective teaching model, Teacher responded very positively. She suggested "...I feel more confident now that I know more about teaching physical education". She also stated that the effective teaching model was also proving to be useful in her teaching beyond the gymnasium, "...I am much more aware of the level of engagement in other subject areas as well".

Teacher C's Opinions

Teacher C felt that the overall experience of being part of the teacher development program was of great benefit to her. She commented:

> I feel that it was the best professional development that I have experienced in my entire 19 years of teaching. It was a privilege to have the peer coaching as the one on one feedback based solely on my teaching techniques was invaluable! It was far superior to any other training I have received in my teaching field. It has been the most worthwhile professional development experience I have been part of.

Teacher C also suggested that the peer coaching experience was "so successful because of it being completely individualized based only on my teaching style." Teacher C's overall feelings seemed to be summed in the statement that "...the process of observation, feedback and very helpful suggestions made for a superior and very worthwhile and effective professional development experience."

When asked if Teacher C would continue to use the effective teaching model, Teacher C responded that it "...was excellent for my students and also very effective for my teaching style." Teacher C also stated that the model "...offered wonderful physical education lessons for my students, giving them maximum activity within the time frame of the lesson." Similar to the other two teachers, Teacher C also thought that the program had also had an effect on her teaching in other subject areas, "the level of engagement, especially my language arts, math, and science activity centres has increased significantly through using the same model" and further stated "I also feel that in these subject areas, my instruction is more effective and individualized and that my students are more focussed on the tasks and the time-on-task is maximized through the use of the teaching strategies from the physical education model".

Summary

The responses from all three of the teachers indicated that they felt that the teacher development program was beneficial to their teaching and had improved their knowledge of physical education instruction. The effective teaching model was also regarded as extremely helpful. The responses suggested that the teachers would not only continue to use the model in their physical education teaching, but would also use it with their regular classroom teaching.

CHAPTER 5

DISCUSSION

The purpose of this study was fourfold: (a) to investigate the effectiveness of an intervention strategy, a teacher development program that emphasizes student learning on student behaviour in physical education; (b) to investigate the students' opinions of their physical education lessons prior to and after the implementation of the teacher development program; (c) to investigate any changes occurring in the teachers' understanding and teaching of physical education; and (d) to investigate the opinions of the teacher participants concerning the teacher development program. Owing to the different dimensions of this study, this discussion is divided into the following sections: effects of the teacher development program on the students' behaviour; changes in students' opinions about their physical education classes; changes in teachers' understanding and teaching of physical education; teachers' opinions about the teacher development program; principal's opinions about the teacher development program; limitations of the research; implications and recommendations; and concluding thoughts.

Effects of the Teacher Development Program on the Students' Behaviour

The teacher development program attempted to change the learning environment created by the three participating teachers. As Wade (1985) suggested, teacher development programs need to not only influence teacher reactions and knowledge but also change teacher behaviour and ultimately the student-learning environment. Therefore, an important consideration in the study was to affect those variables that are found in the student-learning environment and that are controlled by

the teacher participants. Seven dependent variables were monitored: wait time, transition time, management time, activity inappropriate time, receiving information time, activity engaged time, and activity off-task time.

The observation results indicated that there was a change in students' behaviour and this suggests that the teacher development program was successful in changing the learning environment. Student behavioural data clearly indicated that changes occurred after the introduction of the teacher development program. These positive changes in the learning environment were evident in several of the dependent variables measured.

The effects on wait time, although generally positive, were not consistent across all three classes. Class A data were not as conclusive as the data from Classes B and C, a consistent trend was not achieved. Similar to the wait time variable, management time also experienced some inconsistency. Although the trend was difficult to determine in Class A, the data values were small across all three classes after the introduction of the intervention strategy. Also, positive changes in trend and/or level are visually evident.

Of all the variables, transition time experienced the least amount of change. This may be due to the necessity of transitions for lesson progression and that transition times were not high at any phase of the research.

With regard to the other variables, changes of level and trend were visually very clear and pronounced. Inappropriate activity, receiving instruction, engaged in activity, and off-task time, all experienced positive changes and the extent of these changes were visually most evident. In particular, the changes in activity engaged time and receiving information time were the most revealing. Figure 8 clearly illustrates that

the amount of time that students were engaged in physical activity increased, and Figure 7 indicates that receiving information time decreased across all three environments. Figures 6 and 9 illustrate that inappropriate activity time and activity off-task time also decreased after the introduction of the teacher development program intervention. As the changes evident in the learning environment of the three classes were after the introduction of the intervention strategy, they can be attributed to the teacher development program. The teacher development program provided the students with a greater amount of time to participate in appropriate activity than what they were provided with during the earlier baseline stages of the study.

The results from the observational data indicate that the teacher development program did change the teaching behaviour of the three teacher participants in a positive manner and, in doing so, also altered student behaviour in all three of the elementary school physical education classes. Rink (1999) suggested that the time spent by a student engaged at an appropriate level of learning is an important dimension of effective teaching. Also, as students need to be successfully engaged in developmentally appropriate activities to gain motor learning (Cousineau & Luke, 1990; Goldberger & Gerney, 1990; Metzler, 1989; Silverman, 1985, 1990; Silverman et al., 1991), the marked increases in the amount of time that students were engaged in appropriate activity in all three teaching environments, suggests that the teacher development program positively affected the learning environment of the students.

Seyfarth (1996) stated that the ultimate test of success for teacher development programs was when student learning was positively impacted. Therefore, the amount of lesson time that students spent engaged in appropriate learning experiences was

identified as the key dependent variable to determine if the teacher development program affected student learning. In all three classes, preintervention student engagement rates mirrored the findings of Siedentop, Mand, and Taggert (1986) in their review of learning time in physical education. Siedentop et al. found that students were involved in motor activity for only 21-30 % of a lesson. During the baseline phase of this study, the three class environments in this study also recorded student engagement rates within the percentage range identified by Siedentop et al. However, after the introduction of the teacher development program, engagement rates of the students in their physical education classes increased dramatically from baseline amounts. The percentage of lesson time students spent engaged in appropriate learning experiences is indicated in Appendix F. Class A baseline data indicated that the mean percentage amount of time that students were activity engaged was 25.8% whereas, a mean of 68.2% was recorded after the introduction of the teacher development program intervention. Figure 8 clearly indicates that this change in data path level accompanies the introduction of the intervention program. With Class B, a mean of 29.7% of lesson time was found prior to the introduction of the teacher development program. However, a mean of 68.5% was recorded after the introduction of the teacher development program intervention. As Figure 8 indicates the trend of the data path for Class B rises steadily after the intervention program before stabilizing at a high level. However, the difference in the data path level between the two phases is clear and it is at the point when the intervention strategy is introduced that the level in the data changes. Class C recorded the largest change in the data path level with an increase in percentage mean from 26.7% to a percentage mean of 81.1% after the introduction of

the teacher development program. Once more, as Figure 8 demonstrates, the change in the level of the data clearly coincides with the introduction of the intervention strategy.

As Rink (1993) suggested, duration recording can answer how time is used in the different dimensions of the teaching/learning process. Rink further postulated that teachers should aim to have activity engagement rates of at least 50% in their lessons. Therefore, prior to the introduction of the teacher development program, student activity engagement levels were not at a level that would be accepted as effective teaching behaviour for optimal student learning. However, postintervention results clearly illustrate that the teacher development program positively changed student behaviour and provided the students with a more effective learning environment.

The first question addressed in this study was what, if any, are the effects of a teacher development program that emphasizes student learning, on student behaviour in elementary school physical education classes? The findings of this study clearly indicate that the teacher development program was successful in changing student behaviour, and the effects were overwhelmingly positive. The findings indicate that students spent less time receiving information, being off-task, or involved in inappropriate activity and more time engaged in appropriate activity.

Changes in Students' Opinions About Their Physical Education Classes

The second research question asked what, if any, changes occurred in the students' opinions concerning their physical education lessons? From student data collected at the onset of the study, it was apparent that students regarded their physical education lessons as fun. Even when fun was not mentioned, the students valued their participation in their lessons and regarded their lessons to be positive. The youngest

students tended to identify the particular activities of their physical education lessons that they enjoyed. Despite this difference, it was clearly evident through the enthusiasm and the quickness that responses were given that the level of enjoyment was of a similar nature. The notion of fun as a key descriptor of physical education is similar to the work of several researchers who have identified that teachers often regard their lessons to be successful when children are busy, happy, and good (Borys & Fishburne, 1986; Fishburne & Borys, 1987; Hickson & Fishburne, 2001; Placek, 1983; Schempp, 1984, 1985). If teachers promote the characteristic of fun being the major objective in their teaching with their students, then it would seem to be reasonable that students might also begin to think that fun is what their physical education lessons should consist of and that learning is not an objective normally sought after in physical education.

At the onset of the study, the students described their physical education lessons as having a very similar format. Lessons were described as typically having the students involved in stretching or performing exercises, running laps, playing a type of game or an activity, and more stretching or performing exercises to conclude the lesson. This pattern of lesson content was similar amongst the students from all three classes.

Another thread amongst the responses received from the students at the onset of the study was that of the value of physical education. Comments were made concerning the cancellation of physical education lessons. Assemblies, finishing class work, special projects, and student misbehaviour were some of the reasons provided for why students missed their regular physical education classes.

At the conclusion of the study, when asked again to identify what the students felt about their physical education lessons, the main theme identified was that of change. The students from all three separate classes felt that their lessons had changed and that the change was for the better.

Class A students remarked that they were working in group situations more often and that they enjoyed this feature. The notion of students at this grade level certainly fits with the developmental model identified by Fishburne and Kirchner (1998), where students typically at this grade level are very socially aware and work best when placed in group situations with their peers. The notion of having tasks to do was also identified as being a positive change by the students. This theme was also identified in the other two classes. "...doing more things", "...rather than talking or listening or sitting", "...busier", "...I get sweaty", "...I get very tired and hot every lesson" were some of the comments made that indicate the way the students had noticed that their lessons had changed.

It is important to recognize that the students had begun to notice that their lessons were not just keeping them busy (Placek, 1983), they also noted that they were learning, "...cool, new things". The thought of learning as being part of the physical education lesson was not mentioned at the start of the study. However, student responses at the conclusion of the study indicated that they were now involved in activities that promoted learning. Students remarked that their lessons involved learning and attempting new challenges and that they enjoyed this.

Another common theme amongst the responses was that of the use of time in the gymnasium. Students suggested that their classes were far busier, with less time

spent sitting or watching, and more time spent in performance and practice. This response certainly fits with the observational data that indicated that all three of the class environments experienced a marked increase in the amount of time that students were engaged in activity and a decrease in off-task activity. Linked to the notion of the amount of time spent engaged in activity is that of efficiency. Several students believed that their teachers had become better users of the time that they spent in the gymnasium. Lessons were more focussed and had a purpose and that this was reflected in how students were moved from activity to activity, with little wasted time. Students also noted that they had more time and opportunity to practice what was being asked of them and this was helping them to improve their skill levels. Not only did the students notice that there was a difference in the amount of time allocated to physical education, but also that the time spent in the gymnasium was being more efficiently utilized. In a clear change from earlier statements, when students provided many reasons why physical education lessons were missed or cancelled, students at the conclusion of the study thought that their lessons had become more frequent and that everyone went to the gymnasium to participate in their physical education lessons.

Therefore, in regard to the second research question that considered students' opinions of their physical education lessons, in general, the student participants involved in the study noticed considerable changes. The changes stated by the students varied from the amount of physical activity that they experienced in their lessons, to the amount of time provided for physical education lessons, through to the recognition of learning as part of the physical education lesson. The opinions expressed by the students were very accepting of the changes that they experienced and that the changes

to their physical education lessons were viewed to be positive and beneficial. It is important to note that no student responded to any of the postintervention questions in a negative manner, in fact, there was not even a hint of any thought that lessons should return to how they were preintervention.

Threats to internal validity are important issues to consider in research such as this. Consequently, steps were taken to minimize these threats. Students were not informed of the exact nature of the work conducted with the teachers or when the teachers were receiving the teacher development program. Also, students were unaware of the different stages of the research. For example they were not told that the interview was a pre- or postintervention interview or whether there would be other interviews.

As many of the student responses mirrored the topics introduced to the teachers in the teacher development program it can be argued that threats to internal validity that exist with pre- and postintervention interview data were minimized and that the changes that occurred in the students' opinions of their physical education lessons were due to the teacher development program intervention strategy.

Changes in Teachers' Understanding and Teaching of Physical Education

All three teachers regarded their involvement in the teacher development program to be beneficial to their teaching and their own development as a teacher of physical education. Teacher A declared that her understanding of physical education had changed due to the program. She reported feelings of more confidence, had become more appreciative and had developed a better understanding of the planning process, and had begun to plan for more student engagement in her lessons.

Teacher B initially described herself as "…self-taught, not familiar with the curriculum". However, participation in the study caused Teacher B to declare that she had become much more aware of the role of physical education in a child's overall scholastic development. Similar to Teacher A, Teacher B also remarked that her planning for physical education lessons had changed and lessons had begun to focus on on-task behaviours, student learning, and providing students with developmentally appropriate challenges.

Teacher C enjoyed teaching physical education and had, at the start of the study, described herself as having a comfortable level of knowledge with regards to physical education. She had also participated in a number of professional development activities and regarded planning as a part of the process of teaching physical education. Although her initial level of comfort with physical education was high, even Teacher C found that her understanding of physical education had changed considerably due to her participation. She suggested that she now understood the importance of physical education in the overall development of children and had begun to view physical education as a *core subject*. Teacher C further reported that her teaching had changed for the better. It had become more developmentally appropriate and the quality of the instruction that she provided to her students had improved.

The third research question asked what, if any, changes occurred in the teachers' understanding and teaching of physical education? All three-teacher participants clearly indicated that participation in the teacher development program had a very positive effect on their understanding and physical education teaching. The teachers' suggested that their knowledge of the importance of physical education had

increased, that they had a better understanding of developmental appropriateness, that they now knew how to plan for lessons, and that this had resulted in a change in their teaching.

Teachers' Opinions About The Teacher Development Program

Teacher A remarked that being part of the teacher development program was rewarding and beneficial to her professional growth, and that she had successfully used the effective teaching model presented to her in the program in other curricular areas of her teaching. Teacher B stated that her involvement in the teacher development program was worthwhile and beneficial and that her teaching practices had improved. She also stated that she would continue to use the effective teaching model in her physical education teaching and she, too, would also use it in other subject areas as it had "…changed my teaching practice for the better."

Similar to Teachers A and B, Teacher C also reported that her participation in the teacher development program was extremely beneficial and professionally rewarding. In regards to the effective teaching model, Teacher C felt that it was very effective and that it had also had an effect on her teaching in other subject areas, "…the level of engagement, especially my language arts, math, and science activity centres has increased significantly through using the same model…I also feel that in these subject areas, my instruction is more effective".

The fourth research question asked what opinions do the teachers involved in the study have concerning the teacher development program? The opinions expressed by all three-teacher participants indicated that participation in the teacher development program had a very positive effect on their physical education teaching and was viewed

by all the teacher participants to be very beneficial to their professional growth. It was also further mentioned by the teacher participants that the effective teaching model had become a regular part of their physical education teaching repertoire and was also being utilized throughout the school curriculum. Overall, all three teachers felt that the experience was beneficial, professionally rewarding, and the opportunity to participate in the program was valued tremendously.

Principal's Opinions About the Teacher Development Program

The principal requested the opportunity to provide an impartial view of the teacher development program and its effects on both the teachers and the students. The principal noted that physical education lessons seemed to have "...greater variety in activity, more involvement of students" and that teachers were "planning and matching of activities to student ability levels." According to the principal, these changes had created a "...strong positive improvement in teaching...we are more focused on the needs for the students. Students seem more involved, and enjoy the classes more. When I watch, everyone is active and challenging themselves to some skill or task."

Similar to the personal opinions expressed by the teacher participants, the principal also felt that the teacher development program had influenced their teaching behaviour beyond the gymnasium environment, "All that participated seem to have transferred the idea of engagement to other subject areas. Teachers look for ways to fill lesson time with challenges and activities that match student needs. Teachers tell me that behavioural issues are less now as the students are more engaged." The principal also commented upon the design of the teacher development program, "...staff believed it was the key element to putting in to place the growth in their own teaching

repertoires. They loved it!" Supporting the thoughts of Seyfarth (1996), who contended that peer coaching creates an environment that is conducive for the changing of teaching behaviour, the principal further suggested that the "one-on-one coaching ensured that not only did they improve their teaching in physical education but also their teaching in other subject areas. The feedback helped to isolate and address specific elements of instruction." It was further mentioned that the teacher development program was:

> Very valuable. It helped to break an old tradition of teaching. It helped to focus teachers on an alternative way of structuring lessons. The fact that you provided critical attributes or the building blocks of engagement allowed teachers to transfer the ideas to other areas of their teaching. Too often, we receive simple tricks or one shot ideas without fully understanding the theory behind a change, by providing the theory as well as modeling and coaching my teachers were able to own the ideas themselves and transfer it to other places and time. They truly mastered the concepts.

Limitations of the Research

This study has several limitations that need to be identified. Although steps were taken to minimize the possibility of limitations, it is important to recognize that limitations exist and need to be considered when interpreting the results gained in this study.

First, is the issue of student reactivity. It is important for the researcher to minimize student reactivity to the observer and any equipment that is used for data collection. In this study, the students needed to become used to the presence of a video

camera and myself, therefore a minimum of three lessons for each class were taped prior to the onset of data collection in order to lessen the possibility of student reactivity to the presence of an adult and a video camera. However, the possibility of students changing their behaviour and affecting the student behavioural data needs to be considered.

The second limitation is the possibility of students being aware of the stages of data collection. Although teachers were asked not to inform the students when they received the teacher development program, there still remains the possibility that students were able to gain this information. If students did, it could have influenced the responses they provided during the interview sessions.

The third limitation is the absence of data evidence indicating student learning. No data were collected that actually indicated a change in students' skill level. Measures of how students spent their time were utilized to indicate a positive learning environment. This needs to be understood when interpreting the results of the study.

The cooperation of the participants is the fourth limitation in this study. For example, the implementation of the teacher development intervention program was dependent upon the cooperation of the teachers. Similar to the *Hawthorne effect*, the fact that teachers chose to be part of the study could influence their responses and the implementation of new teaching ideas garnered from the intervention program.

The fifth limitation is that of variability. Variability in human behaviour is an area of concern for single-case research. It can prevent conclusions from being made concerning the effects of treatments or intervention strategies (Bailey & Burch, 2002). In order to detect changes in single-case research it is necessary to achieve a period of

little variation in baseline prior to the introduction of the teacher development program intervention strategy. Although attempts were made to achieve this, the number of baselines and the large number of variables investigated caused difficulty in ensuring stability across all baselines. Some baselines had more variability than others. This needs to be considered when considering the results of this study.

A sixth limitation is the issue of generality, as Barlow and Hersen (1984) suggested there is an inability to generalize results achieved in single-case design research. Fraenkel and Wallen (2000) stated that single-case designs are weak in terms of external validity and generalizability. It is only when there is replication of the study across similar settings that the generalization base can increase, lending greater external validity to the design (Fraenkel & Wallen, 2000). Hence, the results of this study should be limited to the situations studied and cannot be generalized with confidence beyond these class settings.

Implications and Recommendations

The findings of this research study present a number of points that either confirm the research literature or are worthy of consideration for further research.

First, the teacher development program did change the behaviour of the students. The changes seen in the student behaviour were due to the teachers providing different instruction and a different learning environment for their students. The research findings clearly demonstrate that the teacher development program was the catalyst for the positive changes seen in the teaching environment. Fullan (1991) suggested that the continuous development of teachers is the cornerstone for teaching improvement. The teacher development program did allow for the teacher participants

to continue in their improvement of personal teaching and also provided the opportunity for the improvement of performance, skills, and understanding of teaching physical education effectively.

Wade (1985) and Seyfarth (1996) both suggested that the highest level of teacher development caused a change not only in teacher knowledge and behaviour but also impacted student learning. The three teacher participants in the research study expressed that their knowledge of physical education teaching had positively changed due to their participation in the study. In agreement with the notions of Wade and Seyfarth, the learning environment in their physical education lessons also changed in a positive manner.

These findings indicate that the teacher development program was successful in impacting the teaching practice and learning environment. It is a program that was successful in achieving a learning environment that promoted opportunities for student learning to occur. Therefore, it deserves further study to understand if it is equally effective and successful with other teachers, in different locations, and with students of all ages.

Second, all three participants commented positively in regard to the manner that the teacher development program was provided to them. Opportunities to discuss new information and strategies (Wade, 1985) in a peer coaching setting (Joyce & Showers, 1988) helped the teachers to learn new teaching behaviours. The peer coaching technique provided the teachers with information about the skills and strategies and the rationale behind the new techniques. It also provided the teacher participants with the opportunity for immediate and consistent feedback on their performance. The findings

from this study support the views that peer coaching is an approach to teacher development that creates an environment that is conducive for changing teaching behaviours.

However, in this study, the principal investigator assumed the role of the peer coach. This raises the question as to whether another individual could undertake the peer coaching position and achieve similar results to the ones gained in this study. Further research needs to be undertaken to understand the influence of the individual who takes on the role of peer coach in the teacher development program utilized in this study. Research needs to be designed to identify what characteristics a peer coach requires in order to effectively deliver the teacher development program. In particular, what knowledge, skills, and attributes the peer coach needs to possess in order for the teacher development program to be delivered with the effectiveness achieved in this study. The results gained from such research would provide valuable information that would assist in understanding how to effectively deliver this teacher development program in other physical education settings. Therefore, an area for future research would be to investigate the influence of the peer coach in the teacher development program put forward in this thesis.

Third, the effective teaching model, which was specifically designed for this research study, was regarded by the teacher participants as practical, useful, and helpful in their teaching. The model was used extensively by the teachers and was effective in their planning and teaching of physical education. Interestingly, the teachers also began to utilize the model in their teaching beyond the gymnasium setting. All three teachers commented that they had utilized the model in other subject areas and had

consequently noticed positive changes in those learning environments too. Similar to the teacher development program, the findings concerning the effective teaching model are also worthy of further research to understand if the model can be successfully used by teachers in other physical education settings and if it can also be utilized in the teaching of curriculum areas other than physical education.

The fourth and last point to consider, in regard to the findings, is the overall view that the teacher development program and the effective teaching model are successful. The findings across the three teacher participants and the learning environments in their physical education classes indicate that student behaviours changed and opportunities for learning increased. Therefore, the program and the method of delivery deserve further research to determine its effectiveness in numerous situations and with teachers at different stages of their careers, including those at the pre-service level. Consideration of the model at the teacher pre-service level would be important, as it would allow for pre-service teachers to develop effective teaching practices early in their careers.

Concluding Thoughts

Throughout Canada educational jurisdictions now refer to *life-long active living* as a goal of their physical education curriculum. It is hoped that physical education can promote a positive attitude toward physical activity and increase participation rates that can offset and reverse the disturbing present trends of inactivity and poor health in children (Hickson, 2003). It is also thought that a well-structured physical education program can enhance and improve the movement proficiency and self-concept of students, thereby promoting the chances for life-long involvement in physical activity

and, ultimately, better health.

As the knowledge, skills, and attitude to become a physically educated person are necessary and key components of a physical education program, educators need to teach for this understanding through effective teaching practices (Hickson, 2003). It is, therefore, essential that such effective teaching practices have student learning as a central consideration and basic tenet. Learning has to be foremost in program planning, lesson delivery, and lesson effectiveness reflection.

Teachers of physical education have the responsibility to use those characteristics and skills that are effective for student learning. It is only then that students will receive the instruction that they need to gain the associated health benefits from being physical active and to truly become physically educated (Hickson & Fishburne, 2001).

This study indicates that a teacher development program that emphasizes student learning can change student behaviour and help to promote an effective learning environment. The results stress the importance of teachers utilizing techniques of effective teaching. The three teachers and the learning environment in their physical education lessons experienced positive changes through the application of effective teaching behaviours emphasized in the teacher development program and the effective teaching model.

It is recommended that the nature of this study is an important area of future investigation and worthy of further research in order to extend the understanding of effective physical education teaching. Such replication would provide confirmation to the extent that the teacher development program and the effective teaching model are

important and valid additions to the physical education teaching literature. It would also provide confirmation of whether the principal was correct in his analysis, when he commented upon the overall value of having staff members involved in the study,

> …it was a very useful experience and has moved my teaching staff in a positive direction that matches our beliefs of good teaching. It has been the thin edge of the wedge to implement differentiated instruction…One of my teachers is recognized as being in the top one per cent of teachers in the province and she has told me it has been the best experience she has had in 18 years. She has increased her level of student engagement significantly in all areas of her teaching.

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Appendix A

Teacher Development Program

The teacher development program comprised of a series of individual sessions that covered particular topics. Each teacher participant received a total of 5.5 hours of individual sessions. Due to the differing length of sessions, some sessions included more than one topic. All three teachers received the same topics in the same set order. The following is a description of the topics and what they consisted of.

Topic #1 - An Overview of the Teacher Development Program

This introductory topic outlined the teacher development program, in order to provide the teacher participant with a clear understanding of the nature of the program and what it consisted of. This topic served as an overview of the teacher development program and provided the teacher with the opportunity to ask questions and gain clarity of understanding as to what their responsibilities were and what they could expect during the study. In this first topic, the following future topics were introduced to the participant: (a) the role of physical education for children; (b) the importance and understanding of developmental appropriateness; (c) the application of theory into practice; (d) the identification of effective teaching behaviours; (e) the instructional strategies that can be utilized in physical education teaching; (f) the proposed model, the theoretical framework, and its implementation; and (g) the importance of reflection. The intention of the overview was not to provide detailed information about the future topics but to alert the participants of what they could expect.

Topic #2 - The Role of Physical Education for Children

This topic area investigated the role of physical education. In particular, the aims and goals of a quality physical education program were discussed, together with the importance of physical education in the overall educational experience of children. A number of documents and resources were used as a basis for information. The *Kindergarten to Grade 12 Program of Studies for Physical Education* (2000) by Alberta Learning, Learning and Teaching Resources Branch was used to provide a rationale and philosophy of why physical education is a part of school programming and the benefits that can be acquired by students participating in a quality program. The *Physical Education Guide to Implementation, Kindergarten to Grade 12* (2000) by Alberta Learning, Learning and Teaching Resources Branch was used to illustrate what a quality program consists of. The text by Kirchner & Fishburne (1998) *Physical Education for Elementary School Children* (10th ed.) New York: McGraw-Hill was also utilized as a support reference for the previous two documents as it covers both the role of physical education and quality programming.

A critical component of this topic was the development of the participant's knowledge and understanding of the value of physical education. Issues such as health and fitness, growth and development, active lifestyle, skill development, personal and social development, self-confidence and self-esteem, and goal setting were addressed in order to for the participant to understand the qualities and the benefits of a quality physical education program. Participants were exposed to research findings that support the inclusion of physical education in the overall educational experiences of children. In particular, the research work of Dwyer et al. (1997), and the reviews of

research by Kirk (1989) and Shephard (1997) were used to illustrate the value of physical education in the holistic development of students. This work indicates that regular participation in physical activity can promote learning throughout the curriculum.

Topic #3 - The Importance and Understanding of Developmental Appropriateness

In this topic, information was presented and discussed to enhance an understanding of what developmental appropriateness is in a physical education setting, what constitutes a developmentally appropriate program, and how such a program can be designed by a teacher to meet the developmental needs of the children in his/her class. In particular, the following were covered: (a) what a developmentally appropriate physical education program consists of (i.e. a program that recognizes the cognitive, emotional and social, and physical needs and levels of the individual as well as the group as a whole); (b) what programs need to be and how they can be taught in order to recognize the unique needs of the individual based on his/her cognitive, emotional and social, and physical needs; (c) what the three developmental levels commonly found in elementary school settings are (Developmental Level I - Kindergarten to Grade 2, Developmental Level II - Grades 3 and 4, Developmental Level III - Grades 5 and 6); (d) what the characteristics are that children at these levels exhibit. The cognitive, emotional and social, and physical characteristics that children normally exhibit in each of the levels; (e) what the particular learning requirements children in these levels have, and (f) what teaching considerations are required to support learning opportunities at each developmental level.

Topic #4 - Putting Theory into Practice

The fourth topic in the teacher development program considered the issue of taking the theoretical information identified in the review of related literature and placing it into the day-to-day practice of teaching.

This topic introduced the research work of Borich (1996) and the reviews conducted by Silverman (1991), Rink (1993), and Mawer (1995) in order to develop a knowledge of the identified effective teaching behaviours and characteristics of teachers, and how this knowledge can be incorporated into regular teaching practice in physical education lessons.

The teacher participants were engaged in discussion about how and why each of the identified teaching characteristics is essential for effective teaching. For example, behaviours such as planning were discussed as it is identified as an effective teaching behaviour. During the discussion on planning, considerations such as the importance of planning, knowing how to plan, and what to plan for were covered. To assist the teacher participant in this thinking, references were made to the planning process in other curriculum areas, such as language arts or mathematics, and how such planning needed to take place in the physical education program also. The effective teaching behaviours identified by Borich (1996), Silverman (1991), Rink (1993), and Mawer (1995) are summarized in tabular form in Table A.

Table A

The Identification of Effective Teaching Behaviours by Author

Author	Effective Teaching Behaviours
Borich (1996)	*Key teaching behaviours* Lesson clarity Instructional variety Teacher task orientation Engagement in the learning process Student success rate. *Helping behaviours* Using student ideas and contributions Structuring Questioning Probing Teacher affect
Silverman (1991)	The anticipation of situations and contingency plans The awareness of individual student skill differences and use of the information in planning and monitoring

Author	Effective Teaching Behaviours
	The acquisition of information to plan
	The knowledge of, and when to use, a repertoire of teaching styles
	The accuracy and focus of explanation and demonstration
	The provision for adequate student practice time
	The maximization of appropriate student practice and engagement
	The minimization of inappropriate student practice and engagement
	The minimization of pupil waiting
Rink (1993)	The identification of intended outcomes for learning
	The planning of learning experiences to accomplish these outcomes
	The presentation of tasks in a clear manner
	The organization and management of the learning environment

Author	Effective Teaching Behaviour
	The monitoring of the environment The development of the lesson content based on student responses The evaluation of the effectiveness of instructional/curricular process.
Mawer (1995)	The good presentation of new material The organization and management of the learning experiences and students The active involvement of the teacher in teaching students The provision of a supportive and positive learning environment The acquisition of a repertoire of teaching styles The ability to teach for the facilitation of student understanding of concepts and lesson content.

Topic #4 - Effective Teaching

The importance of student learning in physical education was stressed in this topic. The research work of Placek (1983), Schempp (1983, 1985), and Hickson and Fishburne (2002) were presented and discussed. Ideas for planning for student learning were explored and developed. In particular, the notion of *Busy, Happy, and Good* (Placek, 1983) was discussed in regard to the issues that make a lesson effective. The effective teaching strategies/techniques presented in the previous session were considered in regards to personal teaching habits. Teacher participants were asked to consider what effective behaviours they already exhibited. Discussion was then changed to the effective behaviours that were not present in their teaching and how such behaviours could become part of their regular teaching repertoire. In particular, the issue of how time can be wasted in lessons due to poor organization and lack of management, as well as by the amount of time students can spend waiting or listening was discussed. Increasing activity time was presented to the teachers as a major goal for their teaching because of the direct relationship of practice to learning.

Topic #5 - Instructional Strategy

This topic aimed to develop an understanding of what a teacher can do to improve his/her instructional strategy. The understanding and selection of teaching styles and methods that are most effective in physical education settings were explored, as was the importance of student engagement (Rink, 1999), and management of the learning environment (Rink, 1993; Mawer, 1995). Participants were introduced to the factors that influence the choice of teaching style and method, for example the learning outcome, the needs of the learner, the lesson content, and the environment. Also,

different teaching strategies were considered. For example, the effectiveness of station work when limited equipment is available, the use of task cards to focus student attention and learning and to minimize time students spent receiving instructions.

Topic #6 - The Effective Teaching Model, the Theoretical Framework, and its Implementation

The model, designed specifically for this study, was introduced in this topic. The three-phase model was explained and discussed so the participant understood the various components associated with the model and the theoretical framework upon which it is based. The model consists of three distinct phases: a thought and planning phase, a decision-making and action phase, and a postlesson reflection phase (see Figure 1). The three phases were discussed and attention was drawn to important features. For example in Phase I, the thought and planning phase of the model, the teacher needs to consider two important features: the determination of student needs (Silverman, 1991) and the planning for student learning (Mawer, 1995; Rink, 1993; Silverman, 1991). This requires the teacher to decide upon the needs of the students in the class with regard to the choice of activity, the developmental appropriateness of the activity, and the curricular relevance and when planning for student learning to determine exactly what is the learning outcome for the lesson and how it might best be achieved. It was discussed why this phase would occur prior to the lesson being taught and comparisons were made between the present practice of the teacher participant and what was aimed for. In Phase II, the decision-making and action phase of the model considers what needs to occur during the lesson. It was explained that the teacher needed to consistently consider and assess what is occurring in the lesson and how it

serves the learning needs of the students. Teaching style and method, clarity of presentation, the provision of positive and well-managed environment in order to support and optimize the learning situation, and the need to ensure that there is a high level of student engagement were all brought to the teacher's attention and importance discussed. Phase III of the model consists post-lesson reflection (Carson, 1997; Jagger, 1989) and the evaluation of effectiveness (Borich, 1996; Rink, 1993). It was discussed with the teacher participants that in this phase, the teacher needed to reflect upon the choices, decisions, and actions made during the first two phases of the model. The teacher also needed to evaluate the lesson content and what student learning occurred. From this reflection and evaluation of the effectiveness of what occurred prior to and during the lesson, decisions could be made for future lesson planning, content, and direction.

Topic #7 - The Importance of Reflection

This topic considered the importance of post-lesson reflection (Carson, 1997; Jagger, 1989) and the evaluation of lesson effectiveness (Borich, 1996; Rink, 1993). Understanding that teacher development requires observation, analysis, and judgment about what occurs during instruction and using that information to make changes in personal teaching behaviours was a critical feature of this topic. The participant explored ways to reflect upon her teaching performance and student learning, and also developed an understanding of how to evaluate for effectiveness. To create relevance and a connection to the teacher participant's present practice, reference was made to evaluation and reflection behaviours that they already practiced in other curricula areas. From this basis, evaluation issues of content appropriateness, monitoring on-task

behaviours, and providing sufficient guidance and encouragement were explored and discussed in connection to the teacher participants' personal teaching.

Appendix B

Interview Questions (Teacher)

Preintervention Questions

1. Please share with me your training and experience related to teaching physical education.

2. How would you describe your typical physical education class?

3. What kinds of challenges, if any, are there that you as a teacher of physical education face on a daily or periodic basis?

4. How much time do you normally spend preparing for a typical physical education class?

5. How effective do you consider your teaching to be in physical education classes?

Postintervention Questions

1. What are your opinions of the model?

2. Do you think that your teaching has changed? If so, how?

3. Do you think that there has been any change in the students? If so, what?

4. Would you continue to use the model for your teaching? Why?

5. Would you suggest any changes to the model? If so, what?

Interview Questions (Student)

Preintervention Questions

1. What do you think of your physical education lessons?
2. What makes a good physical education lesson?
3. How would you describe your typical physical education lesson?
4. What kinds of things do you like to do?
5. How much time do you have for physical education lesson?
6. How do you spend your time in physical education lessons?
7. When do you do your best in your physical education lessons?

Postinterventions Questions

1. Tell me once again what you think of your physical education lessons?
2. What do you now think makes a good physical education lesson?
3. How would you now describe your typical physical education lesson?
4. What kinds of things do you now like to do?
5. Do you still have the same amount of time for physical education?
6. How do you now spend your time in physical education lessons?
7. Tell me again, when do you do your best in your physical education lessons?

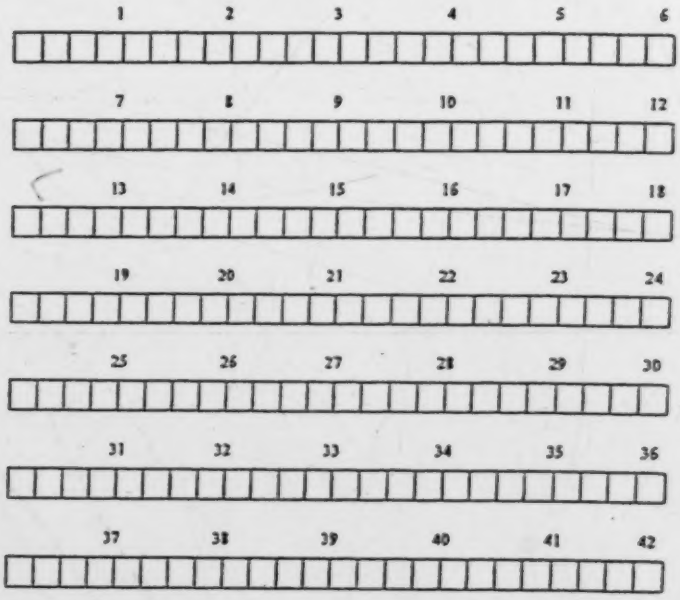
Appendix C

Systematic Observation Instrument

Duration recording instrument

Teacher_____ Lesson Content_____ Date_____ Grade Level____
Time Started____ Time Finished____ No. in Class____ No. Participating____

Wait (W)	Periods of no activity and no movement between activities
Transition (T)	Periods of change from one activity to another (includes lining up or quieting down for the next activity)
Management (M)	Time related to class business unrelated to instructional activity
Activity Engaged (AE)	Students successfully participating in skill practice, scrimmage, game, fitness, or other activities related to the lesson objectives and developmentally appropriate
Activity Off Task (AOT)	Students off task
Activity Inappropriate (AI)	Students active but activity not developmentally appropriate
Receiving Information (RI)	Students attending to teacher directions, demonstrations or other class-related information



Observation Thoughts

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Lesson Percentages

W____ T____ M____ AE____ AOT____ AI____ RI____

Adapted from Siedentop & Tannehill, 2000

On behalf of the Board of School Trustees, I grant permission for staff and students in this School District, _____, to participate in this research study. I
School District Name
understand that I may withdraw this permission at any time during the study without penalty or prejudice.

_____
Signature

Date_____

Appendix E

Interobserver Agreement Scores During the Research Study

Occasion	Interobserver Agreement Percentage
#1 Prior to Data Collection	94%
#2 During Data Collection	91%
#3 During Data Collection	92%
#4 During Data Collection (After Retraining Period)	95%

Appendix F

Student Behavioural Data

Table F1

Observation Recordings of Student Behaviour for Class A

	Preintervention					Postintervention						
Behaviour	1	2	3	4	5	6	7	8	9	10	11	12
Wait time	7.1	2.8	1.6	1.4	2.9	0.0	0.0	4.1	0.0	2.3	0.0	2.7
Transition time	12.9	16.9	18.6	11.1	12.3	8.3	7.5	6.6	15.8	15.9	6.3	5.4
Management time	5.0	10.6	8.8	6.1	7.3	3.3	5.0	2.5	0.0	0.0	2.3	5.3
Activity inappropriate	0.0	0.0	0.0	5.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Receiving information	40.0	26.8	28.2	39.3	45.7	24.2	20.0	14.8	10.2	10.7	16.4	15.2
Activity engaged	25.8	30.3	24.2	27.7	10.9	64.2	64.2	70.5	71.3	67.4	72.7	67.0
Activity off-task	8.6	12.7	18.6	9.1	21.0	0.0	3.3	5.6	2.8	3.8	2.3	4.5

Note. Scores represent percentage of lesson time spent in each variable.

Table F2

Observation Recordings of Student Behaviour for Class B

	Preintervention					Postintervention				
Behaviour	1	2	3	4	5	6	7	8	9	10
Wait time	5.0	4. 6	6.1	6.9	7.8	3.5	1.5	0.0	0.0	0.0
Transition time	10.8	11.3	12.5	11.4	14.1	13.3	13.2	8.0	7.9	6.7
Management time	4.2	2.4	3.6	6.8	1.6	5.3	2.9	1.8	0.8	1.7
Activity inappropriate	0.0	0.0	2.2	0.0	2.3	0.0	0.0	0.0	0.0	0.0
Receiving information	41.7	49.4	41.6	39.4	42.2	24.8	20.6	16.1	14.1	15.8
Activity engaged	31.7	29.0	29.6	30.1	28.1	53.1	61.8	74.2	77.4	75.8
Activity off-task	6.7	3.2	4.4	5.3	3.9	0.0	0.0	0.0	0.0	0.0

Note. Scores represent percentage of lesson time spent in each variable.

Table F3

Observation Recordings of Student Behaviour for Class C

	Preintervention					Postintervention				
Behaviour	1	2	3	4	5	6	7	8	9	10
Wait time	4.8	4.5	12.7	9.8	10.1	0.0	0.0	0.0	0.0	0.0
Transition time	9.7	7.1	10.1	9.1	10.7	7.9	9.3	8.6	8.1	9.0
Management time	8.1	6.2	7.4	7.6	8.4	3.0	4.0	3.1	2.0	4.0
Activity inappropriate	12.1	13.4	7.4	10.6	11.1	0.0	0.0	0.0	0.0	0.0
Receiving information	31.5	30.3	28.7	26.5	27.1	5.5	6.0	7.8	6.1	7.0
Activity engaged	26.6	28.6	25.0	26.5	23.1	82.3	78.7	80.5	83.8	80.0
Activity off-task	7.3	9.8	8.8	9.9	9.5	1.2	2.0	0.0	0.0	0.0

Note. Scores represent percentage of lesson time spent in each variable.

Appendix G

Mean and Standard Deviation Scores

Table G1

Class A Pre- and Postintervention Mean and Standard Deviation (SD) Scores

	Preintervention		Postintervention	
	Mean	SD	Mean	SD
Wait time	3.16	2.06	1.30	1.58
Transition time	14.36	2.88	9.40	4.17
Management time	7.56	1.98	2.34	1.69
Activity inappropriate	1.08	2.16	0.00	0.00
Receiving information	37.60	8.61	15.93	4.59
Activity engaged	24.80	3.15	68.19	3.15
Activity off-task	11.98	3.61	3.19	1.64

Table G2

Class B Pre- and Postintervention Mean and Standard Deviation (SD) Scores

	Preintervention		Postintervention	
	Mean	SD	Mean	SD
Wait time	6.08	1.18	1.00	1.38
Transition time	12.02	1.18	9.82	2.84
Management time	3.72	1.79	2.50	1.55
Activity inappropriate	0.90	1.10	0.00	0.00
Receiving information	42.86	3.41	18.28	3.91
Activity engaged	29.70	1.20	68.46	9.46
Activity off-task	4.70	1.21	0.00	0.00

Table G3

Class C Pre- and Postintervention Mean and Standard Deviation (SD) Scores

	Preintervention		Postintervention	
	Mean	SD	Mean	SD
Wait time	8.38	3.21	0.00	0.00
Transition time	9.34	1.24	8.58	0.53
Management time	7.54	0.76	3.22	0.74
Activity inappropriate	10.92	2.00	0.00	0.00
Receiving information	28.82	1.88	6.48	0.82
Activity engaged	25.96	1.83	81.06	1.79
Activity off-task	9.06	0.96	0.64	0.82